ERTEC

SAMPLING AND ANALYSIS PLAN

PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

PREPARED FOR:

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PREPARED DATE:

FEBRUARY 29, 2016

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Cleanup, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract laboratory program
CWA	Clean Water Act
DQA	Data quality assessment
DQI	Data quality indicators
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
ESA	Environmental site assessment
ESL	Environmental Screening Levels
FSP	Field sampling plan
GC/MS	Gas chromatography and mass spectrometry
IDW	Investigation-derived waste
LCS	Laboratory control sample
MDL	Method detection limit
MQO	Measurement quality objective
MS/MSD	Matrix spike and matrix spike duplicate
mg/L	Milligrams per liter
µg/L	Micrograms per liter
PARCCS	Precision, accuracy, representativeness, completeness, comparability, and sensitivity
PE	Performance evaluation
PRG	Preliminary remediation goal
PRQL	Project-required quantitation limit
QA	Quality assurance
QA/QC	Quality assurance/quality control
QAPP	Quality assurance project plan
QC	Quality control
QL	Quantitation limit
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
%R	Percent recovery
SAP	Sampling and analysis plan (an integrated FSP and QAPP)
SOP	Standard operating procedures
SOW	Statement of work
SVOC	Semi-volatile organic compound
VOC	Volatile organic compound

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1.0 INTRODUCTION

Desarrollo Integral del Sur, Inc. (DISUR) has contracted the services of ERTEC P.S.C. – Environmental Consultants (ERTEC) to perform a Sampling and Analysis Plan (SAP) for former Esso Service Station # 363 (the Site) under its Petroleum Contamination Brownfields Sites program.

1.1 Site Location

The Site was in the past Esso Service Station # 363. The Site is owned by Anselmo Morales Tirado, owner of Morales Bus Services, Inc., HC2 Box 28465, Cabo Rojo, Puerto Rico 00623-9724 and is located at the intersection of 224 Villa Street and 25 de Enero Street, Ponce, Puerto Rico. The coordinates of the Site are 18° 00'37.38'' North and 66°37'18.97'' West, in Greenwich coordinates. The Site has an area of 1,240 square meters. Villa Street is commercial; however, the surrounding area is mixed commercial and residential.

Figure 1 contains the Site Location Map on a United States Geological Survey (USGS) Topographic Map (1:20,000 scale) corresponding to the Ponce Quadrangle (1970, photo-revised in 1982). **Figure 2** contains the Site Plan.

Land use activities adjoining the Site include:

Direction	Description of Adjoining Properties
North	Residences and Vacant Lots
South	Southern Cooling Auto Air Service H. B. Hardware El Nuevo Coqui Restaurant
East	La Casa del Gabinete Residences & Commercial Space Puerto Rico Cleaners
West	Lizzie Graham Elementary School Buildings and Parking Lot

1.1.2 Site Background

Previous to 1934, the Site was owned by West India Oil Company and used as a service station. Previous to that use, two residential units were present on the Site. After 1934, Esso had a gasoline service station at the Site until 2008. The Site has been inactive since 2008 when all of the underground equipment was removed.

The Esso-owned equipment consisted of an office building, an inspection area, three (3) underground storage tanks (USTs) [two (2) for gasoline and one (1) for diesel fuel] with associated fuel lines, three dispenser islands (two for gasoline and one for diesel fuel), four hydraulic lifts and a used oil above ground storage tank (AST). The USTs, AST, associated fuel lines and dispensers and hydraulic lifts were removed in March 2008. The former locations of this equipment are presented on **Figure 2**.

Following is additional information regarding the setting of the Site:

- The Site is underlain by Pleistocene and Holocene alluvial fan deposits (Qf) consisting of crudely and irregularly bedded, fresh to moderately weathered gravel, sand, silt and some clay.
- The depth to groundwater beneath the Site is approximately 12 feet below ground surface (bgs).

- There are eight public water supply wells and 55 private wells located within 1 mile of the Site.

1.1.3 Previous Investigations

The following investigations were previously conducted at the Site for Esso by Soil Tech and ERTEC and submitted to the Puerto Rico Environmental Quality Board (PREQB).

Soil Tech Corporation, November 1, 1993, Report of the Removal and Installation of Underground Storage Tank (UST) Systems

Three (3) gasoline USTs (2-4,000 gallon and 1-6,000 gallon) were removed. One (1) UST had holes in its bottom. Two (2) gasoline USTs (8,000-gallon) were installed in the same pit as those that were removed. Total benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations in Pit III, where the tank with holes was removed, ranged from 3.97 parts per million (ppm) to 65.83 ppm.

ERTEC, October 26, 2000, 1997 Removal of a Diesel Fuel UST and Replacement by a New 4,000-gallon Diesel Fuel UST in the Same Pit

The diesel UST pit was located along the eastern Site boundary. Post-excavation soil sampling and analysis showed no concentrations of BTEX or total petroleum hydrocarbons (TPH).

ERTEC, September 23, 2004, Phase II Environmental Evaluation

Six (6) soil borings were drilled. TPH concentrations in soil samples were all below the PREQB action level of 100 milligrams per kilograms (mg/kg). Six (6) monitoring wells (**MW-101** through **MW-106**) were installed at the locations shown on **Figure 3**. Seven (7) monitoring wells were sampled (including monitoring well **MW-2**) and analyzed for BTEX. Benzene exceeded the PREQB action level of 5 micrograms per liter (ug/L) in

five of the wells. The highest concentration was 90.6 ug/L in monitoring well **MW-102**. Groundwater flow was toward the west. The depth to groundwater was approximately 12 feet bgs.

ERTEC, September 13, 2006, Phase II Environmental Evaluation

Eleven (11) soil borings (**SB-1** through **SB-11**) were drilled throughout the Site at the locations shown on **Figure 4**. Soil samples were analyzed for BTEX, TPH and polynuclear aromatic hydrocarbons (PAH). Groundwater samples from seven wells were analyzed for BTEX.

Soil sample analyses showed that total xylenes concentrations exceeded the PREQB action level of 10 mg/kg in one (1) sample [**SB-7 (12-14)** at 47 mg/kg], TPH-gasoline concentrations exceeded the PREQB action level of 100 mg/kg in one (1) soil sample [**SB-7 (12-14)** at 1,300 mg/kg], TPH-diesel concentrations exceeded the PREQB action level of 100 mg/kg in four (4) samples (**SB-6, SB-7, SB-9 and SB-11** at 570 to 1,900 mg/kg) and TPH-oil concentrations exceeded the PREQB action level of 100 mg/kg in two (2) samples (**SB-9 and SB-11** at 740 and 5,000 mg/kg).

Groundwater sample analyses showed that benzene concentrations exceeded the PREQB action level of 5 ug/L in four (4) monitoring wells. Concentrations ranged from 11 ug/L to 51 ug/L, and the highest concentration was in monitoring well **MW-102**.

ERTEC, February 7, 2008, Groundwater Sampling (May 2007)

The only detected BTEX concentration that exceeded the PREQB action level was 6.2 ug/L of benzene in monitoring well **MW-2.** The location of monitoring well **MW-2** is shown on **Figure 3**.

ERTEC, February 8, 2008, Groundwater Sampling (November 2007)

All detected concentrations of BTEX were below PREQB action levels.

ERTEC, March 27, 2008, Removal of the USTs, Grease Trap and Hydraulic Lifts

Forty-four (44) post-excavation soil samples (**S-1** through **S-44**) were analyzed for BTEX, TPH and PAH. The locations of the post excavation soil samples are shown on **Figure 5**. All detected concentrations of BTEX, TPH-gasoline and PAH were below PREQB action levels. One (1) sample collected near the grease trap from a depth of eight (8) feet bgs exceeded the PREQB action level for TPH-Oil of 100 mg/kg (Sample **S-29** at 5,700 mg/kg). All ten (10) samples collected near Hydraulic Lifts I and II (Samples **S-30** through **S-39**) from depths ranging from 4 to 8 feet bgs exceeded the PREQB action level for TPH-Oil of 100 mg/kg (concentrations ranged from 790 mg/kg to 4,300 mg/kg). Three (3) samples collected near Hydraulic Lift III (Samples **S-42** through **S-44**) exceeded the PREQB action level for TPH-Oil (concentrations ranged from 240 mg/kg to 2,700 mg/kg).

ERTEC, February 3, 2015, Phase I Environmental site Assessment

The previous environmental study conducted at the Site in March 2008 following the removal of the USTs and associated fuel lines, hydraulic lifts, and grease trap in the area of the former diesel fuel dispenser identified the presence of residual total petroleum hydrocarbons in the diesel and oil ranges in the areas of former hydraulic lifts and the former diesel dispenser. To ERTEC's knowledge, these impacts have not been addressed. Further delineation of these impacts is necessary prior to the development of a Remedial Action Plan to address them.

Because of the early date of construction of the on-Site building, asbestos and lead based paint could be present; however, no suspected materials were observed during the Site inspection. A limited asbestos and lead paint survey should be conducted of the on-Site structure prior to any demolition or renovation.

1.4 Purpose/Objective

The objective of this Phase II Environmental Site Assessment (ESA) SAP is to complete the characterization of the Site. This information will be used to evaluate potential soil and groundwater impacts and to prepare a Remedial Action Plan (RAP), if required. The performance of an asbestos/lead paint survey is included in this SAP.

1.5 Selected Analytical Laboratory

Environmental Quality Laboratories, Inc (EQLab) will provide the soil and groundwater analytical services for this activity. Analytical Environmental Services International, Inc. (AESI) of Santurce, Puerto Rico will perform the analyses of asbestos-containing materials (ACM) and lead-based paint (LBP) samples. **Appendix 1** includes EQLab's and AESI's accreditations from the National Environmental Laboratory Accreditation Program (NELAP).

2.0 REGULATORY ACTION LEVELS AND DATA QUALITY OBJECTIVES

2.1 Regulatory Action Levels

The regulatory action levels for soil, groundwater to be used for this activity are provided in **Table 1.** The regulatory action levels for ACM and LPB are 1.0% by volume and 0.5% by weight, respectively.

2.2 Data Quality Objectives

In September 1994, The US EPA issued a document entitled; “Guidance for the Data Quality Objectives Process” (EPA/600/R-96/055). This document listed the seven steps of the Data Quality Objectives Process, which are as follows:

- Step 1: State the Problem
- Step 2: Identify the Decision
- Step 3: Identify the Inputs to the Decision
- Step 4: Define the Study Boundaries
- Step 5: Develop a Decision Rule
- Step 6: Specify Tolerable Limits on Decision Errors;
- Step 7: Optimize the Design

These seven steps are addressed in the Quality Assurance Project Plan (QAPP), Template #3a (Project Definition/Project Description) and Template #3b (Project Quality Objectives/Systematic Planning Process Statements) for this project presented under separate cover.

3.0 SOIL AND GROUNDWATER SAMPLING AND ANALYSIS ACTIVITIES

The sampling and analysis activities of this environmental investigation will include the drilling of soil borings, installation of monitoring wells, collection and laboratory analysis of soil and groundwater samples and characterization and disposal of investigation-derived wastes. The performance of an asbestos/lead paint survey is also included in this SAP.

3.1 Field Activities

The field activities planned for this investigation are described in the following sections.

3.1.1 Soil Borings

Ten (10) soil borings will be drilled at the following locations identified on **Figure 6:**

- Eight (8) borings near the four (4) former hydraulic lifts; and
- Two (2) borings at the former grease trap/diesel fuel dispenser area.

ERTEC will conduct the drilling and sampling activities and control sample custody until the samples are delivered to EQLab. The 10 soil borings will be drilled to a maximum depth of 15 feet bgs or until groundwater is encountered.

ERTEC will conduct a utility survey using Ground Penetrating Radar (GPR) and a pipe and cable locator around soil boring locations. The upper 4 feet of the soil borings will be drilled using a stainless-steel hand auger. The borings will then be completed to their required depth (15 feet) using the CME-55 rotary auger drill rig equipped with seven (7) inch outside diameter steel hollow-stem augers. **Appendices 2** and **3** present the Standard Operation Procedure (SOPs) for drilling and sampling using a hand auger and a rotary rig with hollow-stem augers, respectively.

3.1.2 Soil Sampling

Soil samples from the 0-2 depth interval will be obtained directly from the bucket of the hand auger. Samples from depths of 5-7, 10-12 and 15-17 feet will be obtained using the CME-55 drill rig equipped with a decontaminated two-foot long stainless-steel split-spoon sampler. Soil samples will be identified by the soil boring number followed by the sample depth [SB-1-(0-2)]. Physical descriptions of the soil samples, sample collection time and sample depth will be recorded by ERTEC personnel on the soil boring logs.

Soil samples will be split into two (2) portions, one (1) portion for field screening using a portable Organic Vapor Analyzer with a Photo-Ionization Detector (OVA-PID) and the other portion for laboratory analysis, if necessary. Field screening results will be included on the soil boring logs. Two (2) soil samples will be selected for laboratory analysis from each boring (a total of 20 soil samples) based on the OVA-PID field screening results and field observations, and three (3) duplicate samples will be collected.

3.1.3 Monitoring Well Installation

Three (3) new monitoring wells will be installed at each of the following three (3) locations shown on **Figure 6** to supplement the existing monitoring wells:

- East of the former diesel fuel dispenser area;
- At the southeast corner of the Site; and
- Near the northwest corner of the former pit for the two gasoline USTs.

The monitoring wells will be installed to a depth of 20 feet bgs as the expected depth to groundwater is 12 feet bgs. The monitoring wells will be constructed of 2-inch diameter Schedule 40 PVC screen (0.020-inch-slot) with threaded and coupled Schedule 40 PVC casing. Ten (10) feet of screen and 10 feet of riser pipe will be used to construct

the wells as shown on the generic Monitoring Well Construction Diagram contained in **Appendix 4**. A two-inch diameter plug will be placed at the bottom of each well. After installation of the screen and casing, the annular space will be filled with sand to a depth of two feet above the top of the screen. Two feet of bentonite will be placed on top of the sand pack, and the remainder of the annular space will be grouted to the surface with a cement-water and bentonite mix. The monitoring wells will be completed at the surface with eight-inch diameter steel manholes grouted in place with steel lids with screws. The well casings will be completed with security caps with padlocks.

3.1.4 Monitoring Well Development

The three (3) newly-installed monitoring wells will be developed before being sampled. Before beginning development, the depth to groundwater will be measured. Each monitoring well will be purged with a 12-volt submersible pump. The water purged from the monitoring wells during development will be placed in 55-gallon steel containers.

3.1.5 Groundwater Sampling

Temperature, pH, Specific Conductance and Dissolved Oxygen (DO) will be measured during purging prior to sample collection to confirm that each monitoring well is adequately flushed for representative sampling. The depths to groundwater will be measured before sampling. If liquid phase hydrocarbons (LPH) are present in a well, the thickness of the LPH will be measured, and no sample will be collected for analysis from that well. The three (3) new monitoring wells and seven (7) existing monitoring wells will be sampled (total of 10 groundwater samples), and two (2) duplicate samples will be collected.

During sampling, personnel will wear new nitrile and cut resistant gloves for the handling of equipment and sample containers. Water samples will be transferred from the previously decontaminated dedicated bailers to transparent clear glass 40 milliliter

(ml) vials and amber glass plastic containers provided by the laboratory. Each sample will be labeled with the date and hour of sampling, sample identification number, type of analyses and preservative. Samples containers will then placed on ice in the sample shuttle supplied by the analytical laboratory. ERTEC's personnel will collect the samples and will be responsible for their custody until they are delivered to EQLab.

3.1.6 Quality Control Samples

For soil sample quality control, one (1) field blank (FB prefix), one (1) equipment blank (EB prefix) and one (1) trip blank (TB prefix) will be prepared for each day of sampling [maximum of five (5) days of sampling are expected] and will be analyzed as described in the SOP for Preparation of Field Quality Control Samples provided in **Appendix 5**.

For groundwater quality control, one (1) field blank (FB prefix) and one (1) trip blank (TB prefix) will be collected for each day of sampling [two (2) days of sampling are anticipated] and will be analyzed as described in the SOP for Preparation of Field Quality Control Samples provided in **Appendix 5**. Equipment blanks will not be collected as the groundwater samples will be obtained using dedicated bailers.

3.1.7 Duplicate Samples

Three (3) soil duplicates and two (2) groundwater duplicates will be collected for laboratory analysis.

3.1.8 Preservation and Chain-of-Custody

Immediately after soil and groundwater samples are collected, including quality control samples, samples will be placed on ice in the sample coolers to keep them at a temperature of approximately four degrees centigrade (4ºC) during sampling and transport to the analytical laboratory. Groundwater samples and quality control samples, to be analyzed for volatile organic compounds (VOCs) (Methods 8260B and

8011 for EDB), will be preserved with hydrochloric acid and samples to be analyzed for polyaromatic hydrocarbons (PAH's) (Method 8270C) will be preserved on ice (4ºC).

Chain-of-Custody forms will be completed as described in the SOP for Preparation of Field Quality Control Samples provided in **Appendix 5** to document control of the samples until their delivery to the analytical laboratory. Copies of the Chain-of-Custody (COCs) forms will be provided in the report.

3.1.9 Laboratory Analytical Parameters

The soil and groundwater samples will be analyzed for the following parameters as required by the current PREQB UST regulation:

Soil Samples

Former Hydraulic Lift Areas: eight (8) soil borings to a maximum depth of 15 feet; two (2) soil samples per boring to be analyzed for full VOCs (including BTEX, MTBE, TBA, ethanol, following United States Environmental Protection Agency (USEPA) Method 8260B, 13 polynuclear aromatic hydrocarbons (PAHs) following USEPA Method 8270C, PCBs following USEPA Method 8082 and the RCRA metals (including lead) following USEPA Method 6010B.

Former Grease Trap/Diesel Fuel Dispenser/Used Oil AST Area: two (2) soil borings to a maximum depth of 15 feet; two (2) soil samples per boring to be analyzed for the parameters listed above.

Groundwater Samples

Ten (10) monitoring wells [three (3) new and seven (7) existing]: one (1) sample from each well to be analyzed for the compounds listed above.

3.1.10 Equipment Decontamination

Before commencement of drilling activities and between each soil boring, sampling equipment will be decontaminated. Drilling tools (augers and rods) will be steam cleaned. Standard operating procedures for equipment decontamination are provided in **Appendix 6**.

3.1.11 Personal Protective Equipment

During field activities, field personnel will use Level "D" personal protective equipment including safety hats, ear protection, safety glasses, cloth gloves, long sleeved T-shirts, nitrile gloves, cut resistant gloves, safety boots with steel toes and orange reflector vests. The work areas will be delineated with safety cones with flags, orange safety nets and caution tape.

3.2 Characterization and Disposal of Investigation-Derived Waste

During drilling and sampling activities, 55-gallon steel containers will be used for the storage of soil cuttings pending disposal in accordance with PREQB requirements. The monitoring well development and purged water combined with the decontamination water will be temporarily stored in 55-gallon steel containers. One (1) sample each of the liquid and solid investigation–derived waste will be collected and analyzed for reactivity, corrosivity and ignitability, TCLP volatile organic compounds, TCLP semi-volatile organic compounds and TCLP Metals. Drums will be stored on-site pending disposal in accordance with PREQB requirements. We estimate that five (5) drums will be required for solids and two (2) drums for liquids. The SOP for Investigation–Derived Waste Management is included in **Appendix 7.**

3.3 Sampling Locations

Figure 6 is a diagram of the Site showing the locations of the fourteen (14) proposed soil borings, the three (3) new monitoring wells and the seven (7) existing monitoring wells.

3.4 Analytical Requirements

Tables 2 and **3** list the laboratory analytical method; size, number and type of sampling containers, including method of preservation and holding time for each of the analytical parameters.

4.0 ASBESTOS AND LEAD SURVEY

4.1 Sampling of Suspected Asbestos-Containing Materials (ACM)

A ACMs survey to identify and estimate the quantity of suspected ACMs will be performed at former Esso Service Station 363. Among the materials commonly identified as containing ACMs are:

- Floor vinyl tiles;
- Floor tiles mastic;
- Pipe and tank insulation;
- Insulation mastic;
- Partition panels;
- Transite panels;
- Ceiling tiles;
- Roof insulation.

Following the identification of areas potentially containing ACMs, sampling activities will be carried out by personnel who have complied with the training requirements of 29 C.F.R. § 1910.120, (40-hrs initial training and 8-hrs yearly review) and with National Institute of Occupational Health and Safety (NIOSH) Sampling and Evaluating Airborne Asbestos Dust (NIOSH 582) and with EPA/AHERA (TSCA Title II) Approved Accreditation Training for Asbestos Inspector.

Samples will be collected from every material identified within the structure as potentially containing ACMs. In addition, for quality control purposes, duplicate samples will be collected at a rate of one (1) per each ten (10) samples collected. After sample collection, the sampled area will be covered with an epoxy resin to avoid possible release of ACMs fibers, if any.

Each sample collected will be classified based on the condition of ACMs in that location and the potential for material disturbance. The classification will follow the guidelines recommended by the EPA as a result of the Asbestos Hazard Emergency Response Act (AHERA) and outlined in 40 CFR Part 763.88 dated October 30, 1987 amended by 40CFR Part 61, NESHAP as amended, dated November 20, 1990.

Collected suspected ACMs samples will be analyzed by AES for bulk asbestos content using Polarized Light Microscopy (PLM). It is expected that approximately five (5) samples will be collected from the on-Site structures for ACMs analysis. The number of proposed samples may vary depending on site conditions encountered during fieldwork.

4.2 Sampling of Lead-based Paint (LBP)

The LBP survey will be conducted during the course of the ACMs survey. The survey and sampling activities will be performed by ERTEC's personnel who have complied with the training requirements of 29 C.F.R. § 1910.120, (40-hrs initial training and 8-hrs yearly review), the requirements of the Puerto Rico Lead Poisoning Prevention Act, EQB, Chapter 15(3); O.C.G.A. et. seq., the Rules for Lead Based Paint Abatement and Certification, Chapter 391324 and the requisites of Chapter V Rule 1541, Section B(2) from the Regulation for the Control of Lead-based Paint Mitigation Activities.

During the course of the LPB survey, approximately 20 samples will be collected for analyses of potential lead-containing materials within the on-Site structures. Samples collected will be submitted to AES for analysis. The number of proposed and confirmatory samples may vary depending on site conditions encountered during fieldwork.

4.3 Field Quality Assurance and Quality Control

Confirmatory sampling activities for the presence of ACMs and LPB will include the preparation of sample containers, sample collection, sample preservation, and shipment. Once the containers are filled, the exterior surface will be cleaned with a damp napkin or paper towel. The information on the labels will be verified, a Chain-of-Custody form will be completed, and the containers will be inserted in “zip lock” plastic bags. Samples will be sent to the selected laboratory (AES) keeping track of all persons handling the samples on the Chain-of-Custody form. A copy of the Chain-of-Custody form will be maintained as part of the field project documentation.

4.4 Laboratory Analysis

Construction materials samples will be analyzed for ACMs content using Polarized Light Microscopy (PLM). Paint chip samples will be analyzed for lead by Hotplate or Microwave Base Acid Digestion and Atomic Absorption or Inductively Coupled Plasma Emission Spectroscopy. AESI International Laboratory will perform the laboratory analysis of the ACMs and LPB samples.

5.0 FIELD SAMPLING EQUIPMENT

5.1 Soil Samples

Soil samples for VOCs field screening and laboratory analysis will be obtained from the new soil borings following the procedures described in **Section 3.1.2**. If non-disposable equipment is used in the field for sampling purposes, these will be decontaminated in accordance with the SOP for Equipment Decontamination provided in **Appendix 6**. Instruments used for screening and monitoring will be calibrated and cleaned in accordance with the manufacturer's manual.

5.2 Groundwater Samples

Groundwater samples from the on-Site monitoring wells and the quality control samples to receive laboratory analysis will be obtained following the procedures described in **Section 3.1.5** and in the SOP for the Preparation of Field Quality Control Samples provided in **Appendix 5**.

5.3 Investigation-Derived Waste Samples

The two (2) samples of investigation-derived waste to receive laboratory analysis will be obtained using the procedures described in the SOP for Investigation Derived Waste Management provided in **Appendix 7**.

6.0 SAMPLE DOCUMENTATION AND SHIPPING

All the samples collected during the field sampling and investigation-derived waste management activities will be documented in order to uniquely identify each sample and to keep track of the custody of the samples from the time of their collection to the time of their shipment to the laboratory. The detailed procedures for sample packing and shipping are provided in the SOP in **Appendix 8.**

7.0 QUALITY CONTROL

Appendix 5 contains the detailed procedures for the preparation of field Quality Control Samples including field, trip and equipment blanks.

8.0 REPORTING

The following information will be included in the Phase II Environmental Site Assessment Report:

- Summary of the field conditions during the sampling activity including any deviations from the Sampling and Analysis Plan;
- Diagram of the Site showing the actual soil boring/monitoring well locations;
- Table providing the groundwater sample locations, and the depths and field screening results for soil samples;
- Table listing the analytical parameters, sample identification/location, sample depth, reporting limit and action level and analytical results;
- Complete Level 4 laboratory analytical report containing the analytical results for each sample, date of analysis, analytical method, type and name of analyst;
- Copies of the field data and Chain-of-Custody forms;
- Project Recommendations;
- Manifests –as evidence of investigation-derived waste disposition.

FIGURES

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

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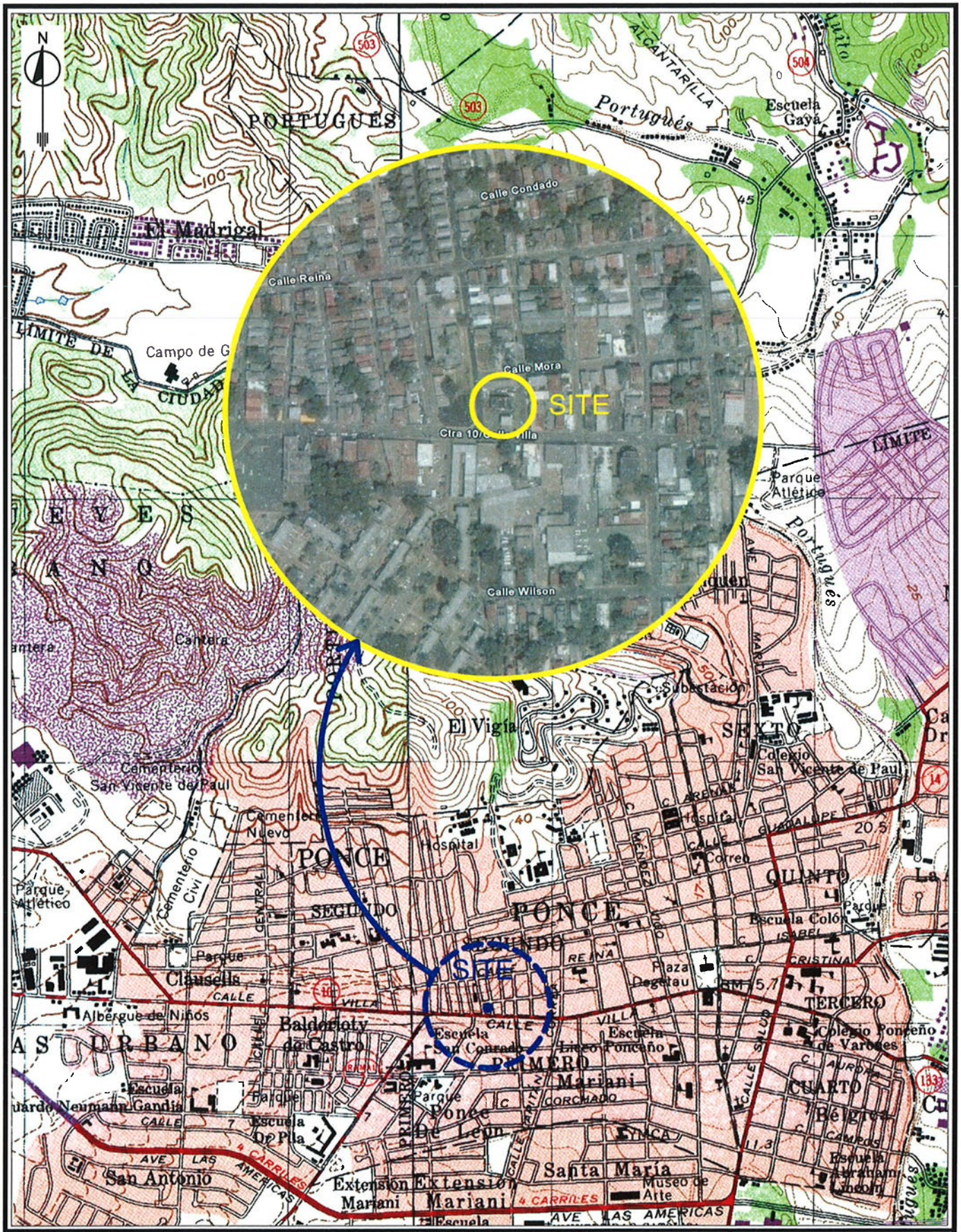

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FIGURE 1 - SITE LOCATION MAP
FORMER ESSO 363 SERVICE STATION (SAP)
PONCE, PUERTO RICO

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ENVIRONMENTAL RESOURCE TECHNOLOGIES

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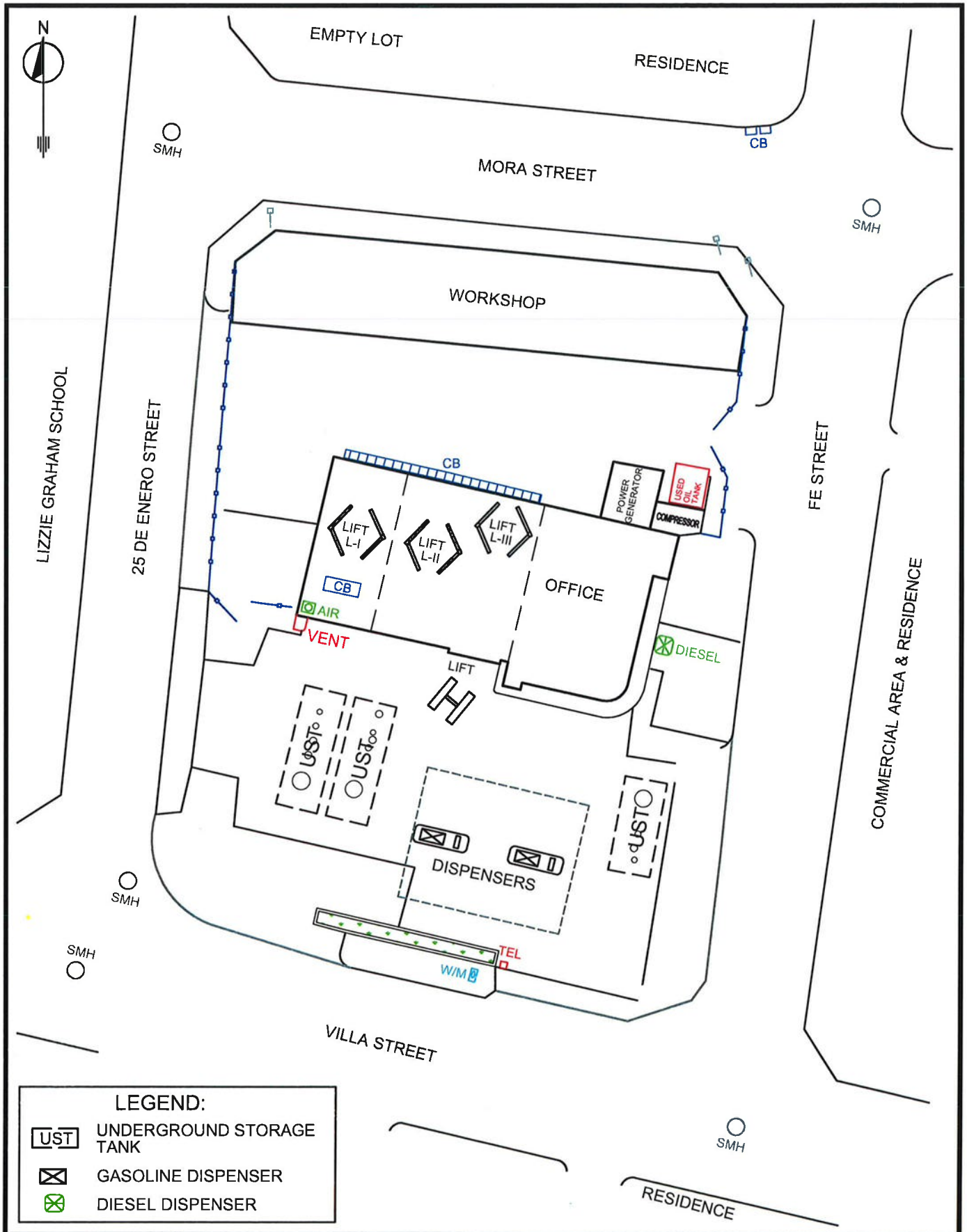

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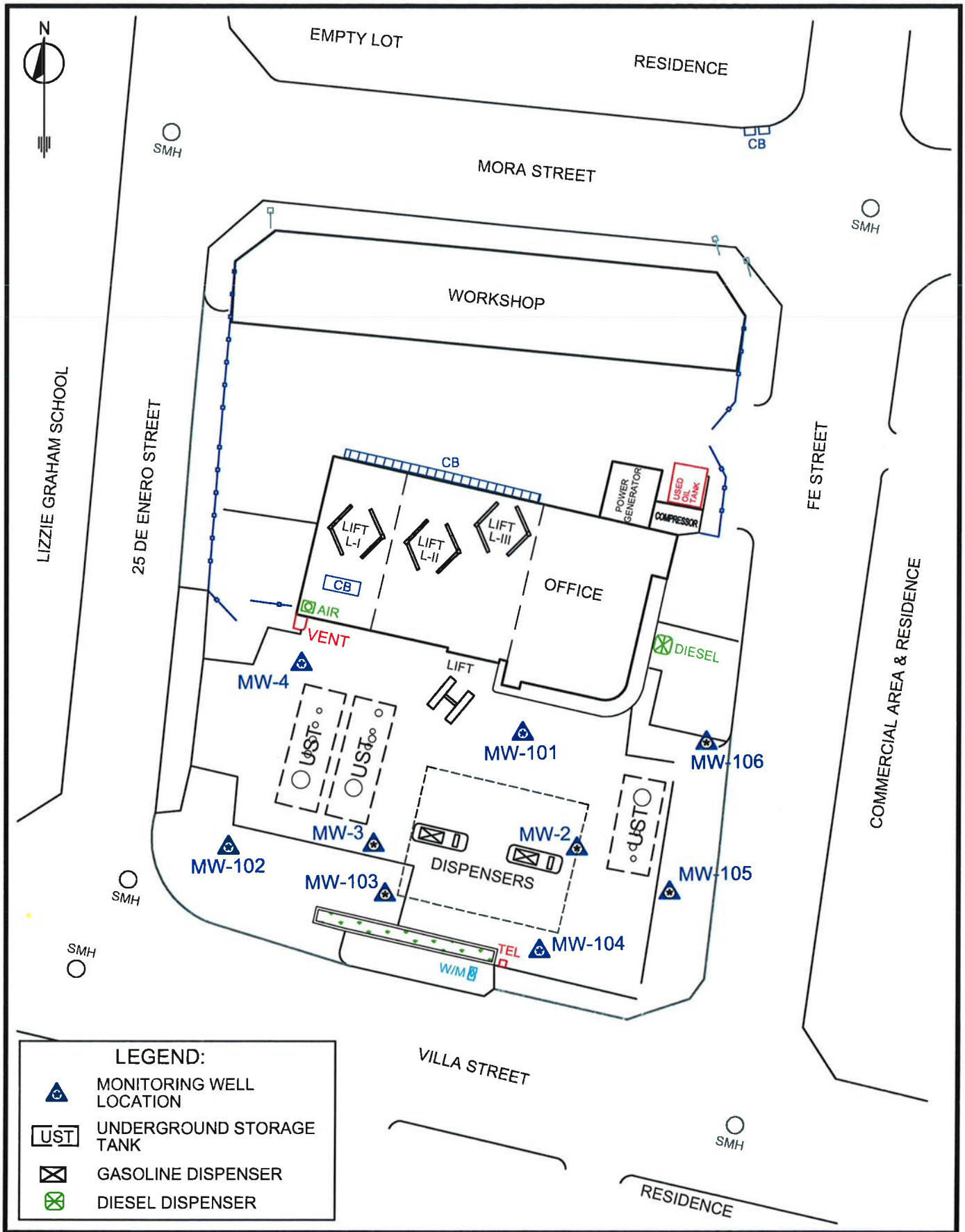
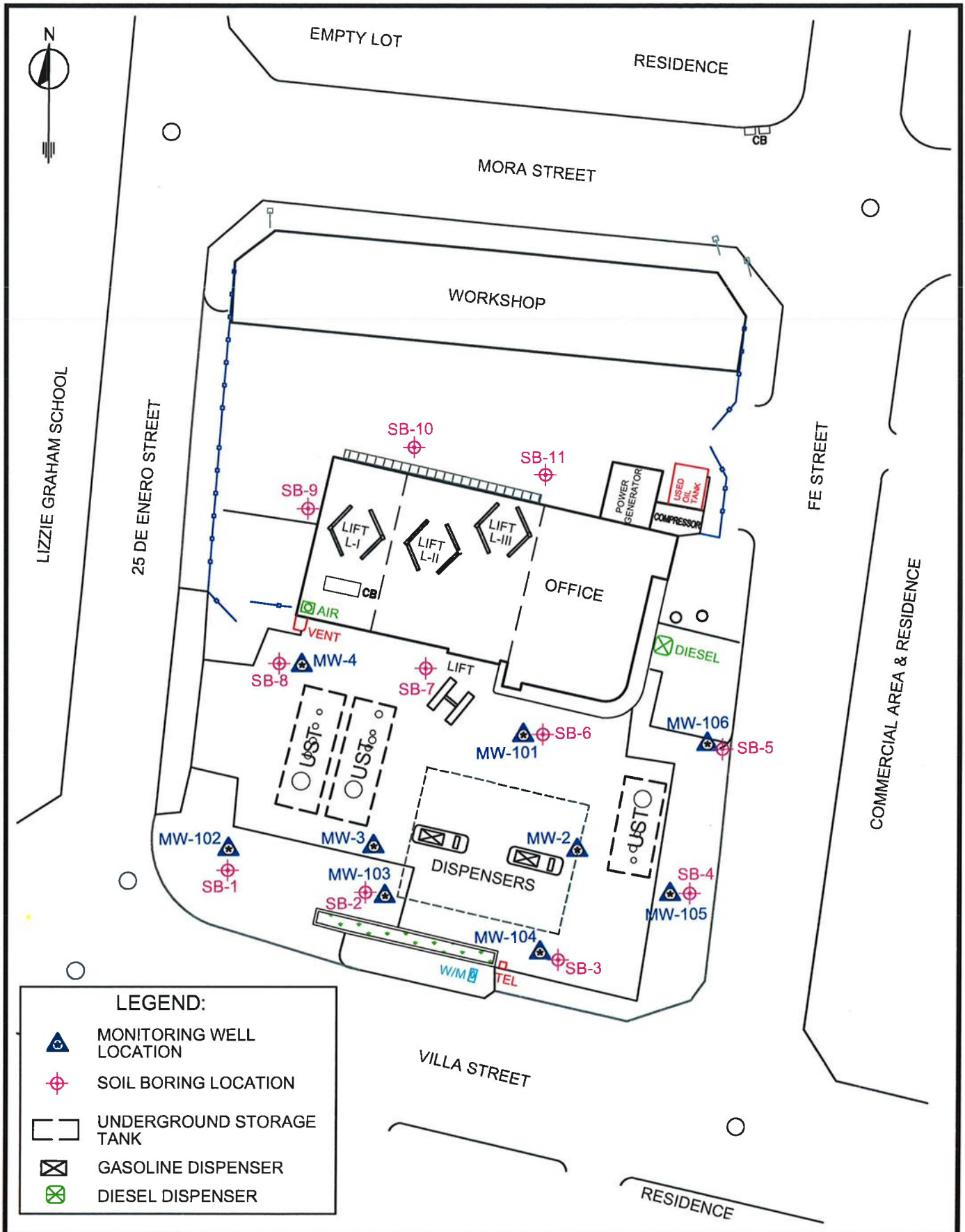


SCALE: NTS REV.: OF FILE: FIG 3 DWG. BY: EGN JOB: E145332	FIGURE 3 - MONITORING WELL LOCATIONS (ERTEC 2004) FORMER ESSO 363 SERVICE STATION (SAP) PONCE, PUERTO RICO	ERTEC ENVIRONMENTAL RESOURCE TECHNOLOGIES

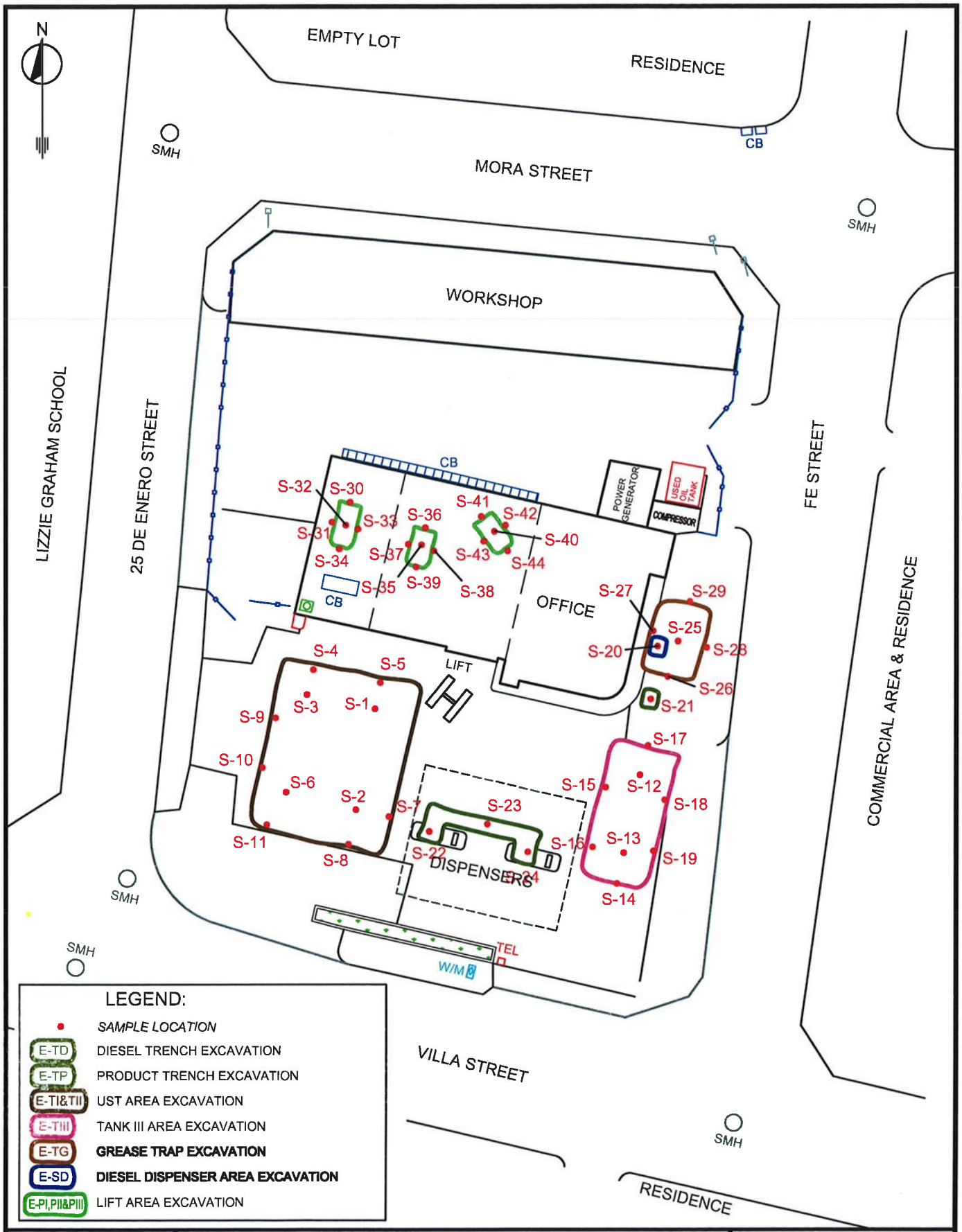
D:\ERTEC NEW ARCHIVE BY EDH\1-ESSO -o- TS TOTAL\363~CO-363\14-5332\SAP PHASE II\FIG 3.dwg, 8/13/2015 1:46:43 PM, iR-ADV C7055



SCALE: NTS	FIGURE 4 - SOIL BORING LOCATIONS (ERTEC 2006) FORMER ESSO 363 SERVICE STATION (SAP) PONCE, PUERTO RICO
REV.: 0F	
FILE: FIG 4	
DWG. BY: EGN	
JOB: E145332	

ERTEC
ENVIRONMENTAL RESOURCE TECHNOLOGIES

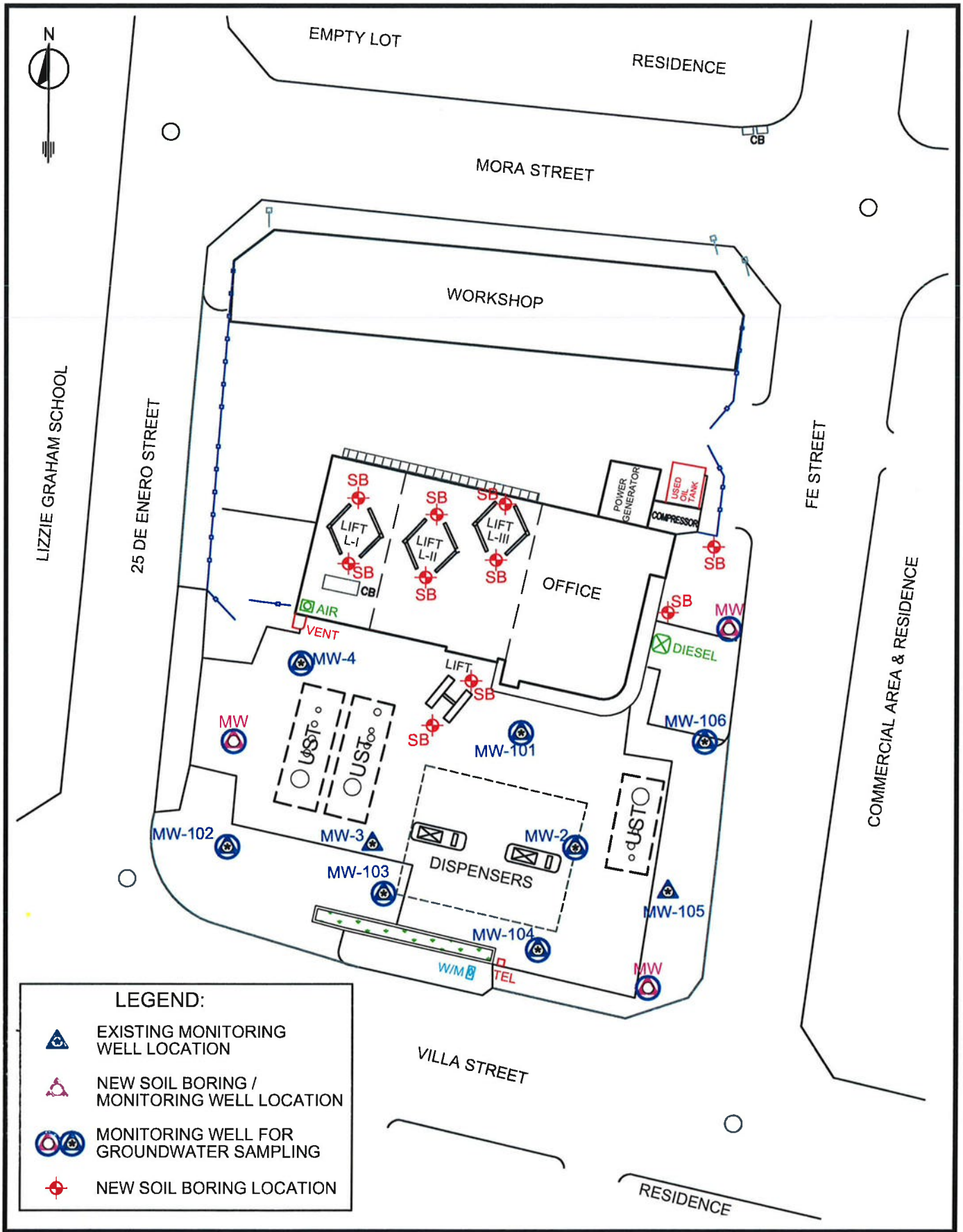
D:\ERTEC NEW ARCHIVE BY EDH\1-ESSO -o- TS TOTAL\363~CO-363\14-5332\SAP PHASE II\FIG 4.dwg, 8/13/2015 1:46:58 PM, iR-ADV C7055



SCALE: NTS	FIGURE 5 - POST EXCAVATION SAMPLES LOCATION FORMER ESSO 363 SERVICE STATION (SAP) PONCE, PUERTO RICO
REV.: 0F	
FILE: FIG 5	
DIB. POR: EGN	
JOB: E145332	

ERTEC
ENVIRONMENTAL RESOURCE TECHNOLOGIES

D:\ERTEC NEW ARCHIVE BY EDH\1-ESSO -o- TS TOTAL\363~CO-363\14-5332\SAP PHASE II\FIG 5.dwg, 8/13/2015 1:50:09 PM, iR-ADV C7055



SCALE: NTS	FIGURE 6 - PROPOSED SOIL & GROUNDWATER SAMPLE LOCATION FORMER ESSO 363 SERVICE STATION (SAP) PONCE, PUERTO RICO
REV.: OF	
FILE: FIG 6	
DWG. BY: EGN	
JOB: E145332	

ERTEC
ENVIRONMENTAL RESOURCE TECHNOLOGIES

D:\ERTEC NEW ARCHIVE BY EDH\1-ESSO -o- TS TOTAL\363~CO-363\14-5332\SAP PHASE II\FIG 6.dwg, 8/13/2015 2:55:33 PM, iR-ADV C7055

TABLES

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

ERTEC

TABLE 1
REGULATORY ACTION LEVELS
SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO
DISUR PROJECT PET 021
ERTEC PROJECT E145332

Compounds of Concern	CAS No.	Soil (mg/kg)			Groundwater (MCL)		
					Groundwater[f]		
		Residential [a]	Industrial [a]	Groundwater Protection [a,c]	Maximum Contaminant Level (MCL) [c]	Potable Water [d]	Class SG [1]
Benzene [g]	71-43-2	1.2	5.1	0.0026	0.005	N/A	0.005
Toluene	108-88-3	490	4,700	0.69	1	N/A	1
Ethylbenzene [g]	100-41-4	5.8	25	0.78	0.7	N/A	0.53
Xylenes (total)	1330-20-7	58	250	9.8	10	N/A	---
Ethylene dibromido (EDB) [b,g]	106-93-4	0.036	0.16	0.000014	0.000052	N/A	---
1,2-cis-Dichloroethylene [g, h]	156-59-2	16	230	0.021	0.07	N/A	---
1,2-trans-Dichloroethylene [g,h]	156-60-5	160	2,300	0.029	0.1	N/A	0.0038
Methyl-tert-butyl-ether (MTBE) [g]	1634-04-4	47	210	0.0032 e	---	0.014	---
Tert-butyl-alcohol (TBA)	75-65-0	---[i]	---[i]	---[i]	--	---	---
Ethanol	64-17-5	---	---	---[j]	---[j]	---	---
Acenaphtene	83-32-9	350	4500	220[k]	--	0.053	0.67
Anthracene	120-12-7	1700	23000	5.8 [e, k, l]	--	0.18	8.3
Benzo(a)anthracene [g]	56-55-3	0.15	2.9	0.12 [e, k, m]		0.000034	0.000038
Benzo(a)pyrene [g]	50-32-8	0.015	0.29	0.24	0.0002	N/A	0.000038
Benzo(b)fluoranthene [g]	205-99-2	0.15	2.9	0.041 [e,k,m]	--	0.000034	---

TABLE 1 (CONT.)
REGULATORY ACTION LEVELS
SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO
DISUR PROJECT PET 021
ERTEC PROJECT E145332

Compounds of Concern	CAS No.	Soil (mg/kg)			Groundwater (MCL)		
					Groundwater'		
		Residential [a]	Industrial [a]	Groundwater Protection [a,c]	Maximum Contaminant Level (MCL) [c]	Potable Water [d]	Class SG [1]
Benzo(g,h,i) pyreno	191-24-2				---[l, o]	---[l, o]	---
Benzo(k)fluoranthene [g]	207-08-9	1.5	29	0.40 [e,k,p]	--	0.00034	0.000038
Chrysene [g]	218-01-9	15	290	1.2 [e,k,q]	--	0.0034	0.000038
Fluoranthene	206-44-0	230	3000	8.9 [e,k,r]	--	0.08	0.13
Fluorene	86-73-7	230	3000	0.54 [e,k,r]	--	0.029	1.1
Naphtalene [g]	91-20-3	3.8	17	0.00054 [e,k,s]	--	0.00017	---
Phenantrene	85-01-8	2,100[k]	4,300[k]	660[k]	0.018[k]	N/A	---
Pyreno	129-00-0	170	2300	1.3 [e,k,t]	--	0.012	0.83
Lead	7439-92-1	400	800	14	0.015		0.015

Notes:

- Screening levels were obtained from "Regional Screening Level (RSL) Summary Table (TR = 10^6, HQ = 0.1) May 2014 (USEPA, 2014a).

[6] Synonimous = 1,2-Dibromoetano = DBE
c Groundwater protection based on Protection MCLs.
[d] Screening level for potable water was selected because MCL was not available.
[e] Screening level for risk-based groundwater protection was selected because MCL was not available.
[f] Water quality criteria for a SG classified wáter body according to Water Quality Regulation of the PREQB, March 2010
[g] COC's are carcinogenous; on the RBCA guide were multiplies x10 to adjust the risk goal of 1 x 10-5 vs 1 x 10^{-6} used for RSL.

TABLE 1 (CONT.)
REGULATORY ACTION LEVELS
SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
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[h] Isomers of (DCE (1,2.DCA))
[i] Cleanup levels for the State of Florida (http://www/dep.state.fl.us/waste/quick topics/rules/documents/62-777/62-777 Table I GroundwaterCTLs.pdf& http:/www.dep.state.fl.us/waste/quick topics/rules/documents/62-777/62-777 Tablel I SoilCTLs.pdf), These ara:
- •Groundwater Criteria - Cleanup Target Level: 1 4 mg/L;
- •Soil Clean-up Target Level: Direct Exposure - Residential: 3,200 mg/kg: Direct Exposure - Industrial: 380,000 mg/kg: Leachabitty based on Groundwater Criteria: 5.7 mg/kg

[j] Clean up levels exist for the State of Florida. These ara:
- •Groundwater Criteria - Cleanup Target Levels : 1.4 mg/L
- •Soil Clean-up Target Level (Leachability based on Groundwater Criteria): 40 mg/kg

[k] Screening levels for the State of Louisiano. Louisiana Department of Environmental Quality (LDEQ) RECAP Table 1. Screening Standards for Soil and Groundwater. Www.deq.state.la.us/portal/Portals/0/technology/recap/2003/RECAP%202003%20Text%20Table%201.pdf
[l] The cleaning or screening levels for TBA in:
- State of Florida: Soil Clean-up Target Level: Leachability based on Groundwater Criteria: 2,500 mg/kg
- State of Louisiana ("screening level"): 120 mg/kg

[m] The screening level for Benzo(a)anthracene in the State of Louisiana is 330 mg/kg.
[n] The screening level for Benzo(b)fluoranthene in the State of Louisiana is 220 mg/kg.
[o] Solamente existen niveles de limpieza para Benzo(g,h,i) pireno en at Estado de Florida.
- •Groundwater Criteria - Cleanup Target Levels: 0.21 mg/L
- •Soil Clean-up Target Level: Direct Exposure - Residential: 2 500 mg/kg, I Direct Exposure - Industrial: 52,000 mg/kg, Leachability based on Groundwater Criteria: 32,000 mg/kg

[p] The screening level for Benzo(k)fluoranthene in the State of Lousiana is es 120 mg/kg.
[q] The screening levels for chrsene are:
- State of Florida: Soil Clean-up Target Level: Soil Clean-up Target Level: Leachability based on Groundwater Criteria: 77 mg/kg
- State of Louisiana ("screning level") 76 mg/kg

[r] The screening level for Fluoranthene and Fluorene in the State of Louisiana is 230 mg/kg.
[s] The screening level for Nafthalene in the State of Louisiana es 1.5 mg/kg.
[t] The screening level for Pyrene in the State of Lousiana es 1,100 mg/kg .

TABLE 2

ANALYTICAL REQUIREMENTS FOR GROUNDWATER SAMPLES AND INVESTIGATION-DERIVED WASTE LIQUID SAMPLE
SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO
DISUR PROJECT PET 021
ERTEC PROJECT E145332

Parameter	Analytical Method	Containers	Preservative	Holding Time
GROUNDWATER SAMPLES				
VOCs	8260B	40 mL vial	HCl,pH<2, 4°C	14 days
SVOCs	8270C	1 liter amber	Cool 4°C	7/40 days
Ethylene Dibromide	8011	40 mL vial	HCl,pH<2, 4°C	14 days
PCBs	8082	1000 mL Plastic	Cool 4°C	7/40 days
RCRA Metals	6010B, 7471A	1000 mL Plastic	HNO_3,pH<2, 4°C	180 days
INVESTIGATION-DERIVED WASTE LIQUID SAMPLE				
TCLP Volatiles	8260B	40 mL vial	HCl,pH<2,4°C	14 days
TCLP Semi-volatiles	8270B	1000ml glass	Cool 4°C	14 days
TCLP Metals	6010B, 7471A	250ml glass	Cool 4°C	6 Months
Reactivity	7.3.3/7.3.4	250 ml glass	Cool 4°C	ASAP
Corrosivity	9040	250 ml glass	Cool 4°C	ASAP
Ignitability	1010	250 ml glass	Cool 4°C	ASAP

TABLE 3

ANALYTICAL REQUIREMENTS FOR SOIL SAMPLES AND INVESTIGATION SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO
DISUR PROJECT PET 021
ERTEC PROJECT E145332

Parameter	Analytical Method	Containers	Preservative	Holding Time
SOIL SAMPLES				
VOCs	8260B	4 oz. glass jar	Cool 4^{o}C	14 days
SVOCs	8270C	8 oz. glass jar	Cool 4^{o}C	14/40 days
PCBs	8082	8 oz. glass jar	Cool 4^{o}C	14/14 days
Ethylene Dibromide	8011	4 oz. glass jar	Cool 4^{o}C	14 days
RCRA Metals	6010B, 7471A	4 oz. glass jar	Cool 4^{o}C	180 days
INVESTIGATION-DERIVED WASTE LIQUID SAMPLE				
TCLP Volatiles	8260B	4 or 8 oz. glass jar	Cool 4^{o}C	14 days
TCLP Semi-volatiles	8270B	4 or 8 oz. glass jar	Cool 4^{o}C	14 days
TCLP Metals	6010B	4 or 8 oz. glass jar	Cool 4^{o}C	6 Months
Reactivity	7.3.3/7.3.4	4 or 8 oz. glass jar	Cool 4^{o}C	ASAP
Corrosivity	9045	4 or 8 oz. glass jar	Cool 4^{o}C	ASAP
Ignitability	1030	4 or 8 oz. glass jar	Cool 4^{o}C	ASAP

APPENDIX 1

EQLAB AND AES NELAP ACCREDITATIONS

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

State of Florida

Department of Health, Bureau of Public Health Laboratories

This is to certify that

E87783

ENVIRONMENTAL QUALITY LABORATORIES, INC. - PR
PARQUE INDUSTRIAL MINILLAS 60 CALLE E
BAYAMON, PR 00956

has complied with Florida Administrative Code 64E-1,
for the examination of environmental samples in the following categories

NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Public Health Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

Date Issued: July 01, 2015 Expiration Date: June 30, 2016

Carina Blackmore, DVM, PhD, Dipl. ACVPM, CPM
Chief, Bureau of Public Health Laboratories
DH Form 1697, 7/04
NON-TRANSFERABLE E87783-35-07/01/2015
Supersedes all previously issued certificates

Laboratory Scope of Accreditation

Attachment to Certificate #: E87783-35, expiration date June 30, 2016. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87783 **EPA Lab Code: PR00014** **(787) 288-6420**

E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1,1-Trichloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1,2,2-Tetrachloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1,2-Trichloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1-Dichloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1-Dichloroethylene	EPA 624	Volatile Organics	NELAP	2/5/2002
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2,4-Trichlorobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/5/2002
1,2-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
1,2-Dichloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Dichloropropane	EPA 624	Volatile Organics	NELAP	2/5/2002
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,2-Diphenylhydrazine	EPA 8270	Extractable Organics	NELAP	4/1/2004
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,3-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/5/2002
1,3-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	4/1/2004

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Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,4-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/5/2002
1,4-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
1-Chlorohexane	EPA 8260	Volatile Organics	NELAP	4/1/2004
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	4/1/2004
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 625	Extractable Organics	NELAP	2/5/2002
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	4/1/2004
2,4,5-T	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	12/3/2014
2,4,6-Trichlorophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2,4-D	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
2,4-DB	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
2,4-Dichlorophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2,4-Dimethylphenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2,4-Dinitrophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Extractable Organics	NELAP	2/5/2002
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	12/1/2011
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	4/1/2004
2-Chloronaphthalene	EPA 625	Extractable Organics	NELAP	2/5/2002
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Chlorophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	4/1/2004
2-Hexanone	EPA 8260	Volatile Organics	NELAP	4/1/2004
2-Methyl-4,6-dinitrophenol	EPA 625	Extractable Organics	NELAP	2/5/2002

Laboratory Scope of Accreditation

Attachment to Certificate #: E87783-35, expiration date June 30, 2016. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87783 **EPA Lab Code: PR00014** **(787) 288-6420**

E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	4/1/2004
2-Nitrophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
3,3'-Dichlorobenzidine	EPA 625	Extractable Organics	NELAP	2/5/2002
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	4/1/2004
4,4'-DDD	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
4,4'-DDE	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
4,4'-DDT	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	12/1/2011
4-Bromophenyl phenyl ether	EPA 625	Extractable Organics	NELAP	2/5/2002
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	4/1/2004
4-Chloro-3-methylphenol	EPA 625	Extractable Organics	NELAP	12/12/2005
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	12/12/2005
4-Chlorophenyl phenylether	EPA 625	Extractable Organics	NELAP	2/5/2002
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	4/1/2004
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	4/1/2004
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	12/1/2011
4-Methylphenol (p-Cresol)	EPA 8270	Extractable Organics	NELAP	4/1/2004
4-Nitrophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
Acenaphthene	EPA 625	Extractable Organics	NELAP	12/12/2005
Acenaphthene	EPA 8270	Extractable Organics	NELAP	12/12/2005
Acetone	EPA 8260	Volatile Organics	NELAP	12/1/2011
Acetonitrile	EPA 8260	Volatile Organics	NELAP	12/1/2011
Acrolein (Propenal)	EPA 624	Volatile Organics	NELAP	2/5/2002
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	12/1/2011
Acrylonitrile	EPA 624	Volatile Organics	NELAP	2/5/2002
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	12/1/2011
Aldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Alkalinity as CaCO3	EPA 310.2	General Chemistry	NELAP	2/5/2002

Laboratory Scope of Accreditation

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State Laboratory ID: **E87783** **EPA Lab Code:** **PR00014** **(787) 288-6420**

E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Aluminum	EPA 200.7	Metals	NELAP	2/5/2002
Aluminum	EPA 6010	Metals	NELAP	4/1/2004
Aluminum	SM 3120 B	Metals	NELAP	2/24/2009
Ammonia as N	SM 4500-NH3 D (19th, 20th, 21st Ed.)/ISE	General Chemistry	NELAP	12/1/2011
Anthracene	EPA 625	Extractable Organics	NELAP	2/5/2002
Anthracene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Antimony	EPA 200.7	Metals	NELAP	2/24/2009
Antimony	EPA 200.9	Metals	NELAP	2/5/2002
Antimony	EPA 6010	Metals	NELAP	2/24/2009
Antimony	EPA 7010	Metals	NELAP	12/1/2011
Antimony	SM 3120 B	Metals	NELAP	2/24/2009
Aroclor-1016 (PCB-1016)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	12/1/2011
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	12/1/2011
Aroclor-1221 (PCB-1221)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Aroclor-1232 (PCB-1232)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/3/2006
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/3/2006
Aroclor-1242 (PCB-1242)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	12/1/2011
Aroclor-1248 (PCB-1248)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Aroclor-1254 (PCB-1254)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/3/2006
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/3/2006
Aroclor-1260 (PCB-1260)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/3/2006
Arsenic	EPA 200.7	Metals	NELAP	2/24/2009
Arsenic	EPA 200.9	Metals	NELAP	2/5/2002
Arsenic	EPA 6010	Metals	NELAP	2/24/2009
Arsenic	EPA 7010	Metals	NELAP	12/1/2011
Arsenic	SM 3120 B	Metals	NELAP	2/24/2009
Barium	EPA 200.7	Metals	NELAP	2/5/2002
Barium	EPA 6010	Metals	NELAP	4/1/2004

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Barium	SM 3120 B	Metals	NELAP	2/24/2009
Benzene	EPA 624	Volatile Organics	NELAP	2/5/2002
Benzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Benzidine	EPA 625	Extractable Organics	NELAP	2/5/2002
Benzidine	EPA 8270	Extractable Organics	NELAP	4/1/2004
Benzo(a)anthracene	EPA 625	Extractable Organics	NELAP	12/12/2005
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	12/12/2005
Benzo(a)pyrene	EPA 625	Extractable Organics	NELAP	2/5/2002
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Benzo(b)fluoranthene	EPA 625	Extractable Organics	NELAP	12/3/2014
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	12/3/2014
Benzo(g,h,i)perylene	EPA 625	Extractable Organics	NELAP	2/5/2002
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Benzo(k)fluoranthene	EPA 625	Extractable Organics	NELAP	12/12/2005
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	12/12/2005
Beryllium	EPA 200.7	Metals	NELAP	2/5/2002
Beryllium	EPA 6010	Metals	NELAP	4/1/2004
Beryllium	SM 3120 B	Metals	NELAP	2/24/2009
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Biochemical oxygen demand	SM 5210 B	General Chemistry	NELAP	2/5/2002
bis(2-Chloroethoxy)methane	EPA 625	Extractable Organics	NELAP	2/5/2002
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	4/1/2004
bis(2-Chloroethyl) ether	EPA 625	Extractable Organics	NELAP	2/5/2002
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	4/1/2004
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625	Extractable Organics	NELAP	2/5/2002
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	4/1/2004
Boron	EPA 200.7	Metals	NELAP	2/5/2002
Boron	EPA 6010	Metals	NELAP	4/1/2004
Boron	SM 3120 B	Metals	NELAP	2/24/2009
Bromobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Bromodichloromethane	EPA 624	Volatile Organics	NELAP	2/5/2002
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Bromoform	EPA 624	Volatile Organics	NELAP	2/5/2002

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Bromoform	EPA 8260	Volatile Organics	NELAP	4/1/2004
Butyl benzyl phthalate	EPA 625	Extractable Organics	NELAP	10/3/2006
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	4/1/2004
Cadmium	EPA 200.7	Metals	NELAP	2/5/2002
Cadmium	EPA 200.9	Metals	NELAP	2/5/2002
Cadmium	EPA 6010	Metals	NELAP	2/5/2002
Cadmium	EPA 7010	Metals	NELAP	12/1/2011
Cadmium	SM 3120 B	Metals	NELAP	2/24/2009
Calcium	EPA 200.7	Metals	NELAP	2/5/2002
Calcium	EPA 6010	Metals	NELAP	4/1/2004
Calcium	SM 3120 B	Metals	NELAP	2/24/2009
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	4/1/2004
Carbon tetrachloride	EPA 624	Volatile Organics	NELAP	2/5/2002
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	4/1/2004
Carbonaceous BOD (CBOD)	SM 5210 B	General Chemistry	NELAP	2/5/2002
Chemical oxygen demand	EPA 410.4	General Chemistry	NELAP	2/5/2002
Chlordane (tech.)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Chloride	SM 4500-Cl^- E	General Chemistry	NELAP	2/24/2009
Chlorobenzene	EPA 624	Volatile Organics	NELAP	2/5/2002
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Chloroethane	EPA 624	Volatile Organics	NELAP	2/5/2002
Chloroethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Chloroform	EPA 624	Volatile Organics	NELAP	2/5/2002
Chloroform	EPA 8260	Volatile Organics	NELAP	4/1/2004
Chlorophylls	SM 10200 H	General Chemistry	NELAP	2/5/2002
Chromium	EPA 200.7	Metals	NELAP	2/5/2002
Chromium	EPA 200.9	Metals	NELAP	2/5/2002
Chromium	EPA 6010	Metals	NELAP	2/5/2002
Chromium	EPA 7010	Metals	NELAP	12/1/2011
Chromium	SM 3120 B	Metals	NELAP	2/24/2009
Chromium VI	SM 3500-Cr B (20th/21st/22nd Ed.)/UV-VIS	General Chemistry	NELAP	12/1/2011
Chrysene	EPA 625	Extractable Organics	NELAP	2/5/2002
Chrysene	EPA 8270	Extractable Organics	NELAP	4/1/2004

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E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	4/1/2004
cis-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	2/5/2002
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Cobalt	EPA 200.7	Metals	NELAP	2/5/2002
Cobalt	EPA 6010	Metals	NELAP	4/1/2004
Cobalt	SM 3120 B	Metals	NELAP	2/24/2009
Color	SM 2120 B	General Chemistry	NELAP	2/24/2009
Conductivity	EPA 120.1	General Chemistry	NELAP	2/5/2002
Conductivity	SM 2510 B	General Chemistry	NELAP	2/24/2009
Copper	EPA 200.7	Metals	NELAP	2/5/2002
Copper	EPA 200.9	Metals	NELAP	2/5/2002
Copper	EPA 6010	Metals	NELAP	2/5/2002
Copper	EPA 7010	Metals	NELAP	12/1/2011
Copper	SM 3120 B	Metals	NELAP	2/24/2009
Cyanide	EPA 335.4	General Chemistry	NELAP	2/5/2002
Dalapon	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
delta-BHC	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Dibenz(a,h)anthracene	EPA 625	Extractable Organics	NELAP	2/5/2002
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Dibromochloromethane	EPA 624	Volatile Organics	NELAP	10/3/2006
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Dibromomethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Dicamba	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Dichloroprop (Dichlorprop)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Dieldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	7/28/2009
Diethyl phthalate	EPA 625	Extractable Organics	NELAP	12/12/2005
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	12/12/2005
Dimethyl phthalate	EPA 625	Extractable Organics	NELAP	2/5/2002

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	4/1/2004
Di-n-butyl phthalate	EPA 625	Extractable Organics	NELAP	2/5/2002
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	4/1/2004
Di-n-octyl phthalate	EPA 625	Extractable Organics	NELAP	2/5/2002
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	4/1/2004
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Endosulfan I	EPA 608	Pesticides-Herbicides-PCB's	NELAP	12/3/2014
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	12/3/2014
Endosulfan II	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Endosulfan sulfate	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Endrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Endrin aldehyde	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	12/1/2011
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	EPA 8260	Volatile Organics	NELAP	4/1/2004
Ethyl acetate	EPA 8260	Volatile Organics	NELAP	12/1/2011
Ethylbenzene	EPA 624	Volatile Organics	NELAP	2/5/2002
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Fluoranthene	EPA 625	Extractable Organics	NELAP	2/5/2002
Fluoranthene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Fluorene	EPA 625	Extractable Organics	NELAP	2/5/2002
Fluorene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Fluoride	SM 4500 F-C	General Chemistry	NELAP	2/5/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Gasoline range organics (GRO)	EPA 8015	Extractable Organics	NELAP	2/17/2011
Heptachlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Heptachlor epoxide	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Hexachlorobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Hexachlorobutadiene	EPA 625	Extractable Organics	NELAP	2/5/2002
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Hexachlorocyclopentadiene	EPA 625	Extractable Organics	NELAP	2/5/2002
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Hexachloroethane	EPA 625	Extractable Organics	NELAP	2/5/2002
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	4/1/2004
Ignitability	EPA 1010	General Chemistry	NELAP	7/1/2003
Indeno(1,2,3-cd)pyrene	EPA 625	Extractable Organics	NELAP	2/5/2002
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	4/1/2004
Iron	EPA 200.7	Metals	NELAP	2/5/2002
Iron	EPA 6010	Metals	NELAP	2/24/2009
Iron	SM 3120 B	Metals	NELAP	2/24/2009
Isophorone	EPA 625	Extractable Organics	NELAP	12/12/2005
Isophorone	EPA 8270	Extractable Organics	NELAP	12/12/2005
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Kjeldahl nitrogen - total	EPA 351.2	General Chemistry	NELAP	2/5/2002
Lead	EPA 200.7	Metals	NELAP	2/24/2009
Lead	EPA 200.9	Metals	NELAP	2/5/2002
Lead	EPA 6010	Metals	NELAP	2/24/2009
Lead	EPA 7010	Metals	NELAP	12/1/2011
Lead	SM 3120 B	Metals	NELAP	2/24/2009
Lithium	EPA 6010	Metals	NELAP	2/24/2009
Magnesium	EPA 200.7	Metals	NELAP	2/5/2002
Magnesium	EPA 6010	Metals	NELAP	4/1/2004
Magnesium	SM 3120 B	Metals	NELAP	2/24/2009
Manganese	EPA 200.7	Metals	NELAP	2/5/2002
Manganese	EPA 6010	Metals	NELAP	4/1/2004
Manganese	SM 3120 B	Metals	NELAP	2/24/2009
MCPA	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
MCPP	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Mercury	EPA 245.1	Metals	NELAP	2/5/2002
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Methyl bromide (Bromomethane)	EPA 624	Volatile Organics	NELAP	2/5/2002
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	4/1/2004
Methyl chloride (Chloromethane)	EPA 624	Volatile Organics	NELAP	12/12/2005
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	12/12/2005
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	12/1/2011
Methylene chloride	EPA 624	Volatile Organics	NELAP	12/12/2005
Methylene chloride	EPA 8260	Volatile Organics	NELAP	12/12/2005
Mirex	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Molybdenum	EPA 200.7	Metals	NELAP	2/5/2002
Molybdenum	EPA 6010	Metals	NELAP	2/5/2002
Molybdenum	SM 3120 B	Metals	NELAP	2/24/2009
Naphthalene	EPA 625	Extractable Organics	NELAP	2/5/2002
Naphthalene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Naphthalene	EPA 8270	Extractable Organics	NELAP	4/1/2004
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Nickel	EPA 200.7	Metals	NELAP	2/5/2002
Nickel	EPA 200.9	Metals	NELAP	2/24/2009
Nickel	EPA 6010	Metals	NELAP	2/5/2002
Nickel	EPA 7010	Metals	NELAP	12/1/2011
Nickel	SM 3120 B	Metals	NELAP	2/24/2009
Nitrate as N	EPA 353.2	General Chemistry	NELAP	2/5/2002
Nitrate-nitrite	EPA 353.2	General Chemistry	NELAP	2/5/2002
Nitrite as N	EPA 353.2	General Chemistry	NELAP	2/5/2002
Nitrobenzene	EPA 625	Extractable Organics	NELAP	2/5/2002
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	4/1/2004
n-Nitrosodimethylamine	EPA 625	Extractable Organics	NELAP	12/12/2005
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	12/12/2005
n-Nitrosodi-n-propylamine	EPA 625	Extractable Organics	NELAP	12/12/2005
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	12/12/2005
n-Nitrosodiphenylamine	EPA 625	Extractable Organics	NELAP	2/5/2002
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	4/1/2004

Laboratory Scope of Accreditation

Attachment to Certificate #: E87783-35, expiration date June 30, 2016. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87783 **EPA Lab Code: PR00014** **(787) 288-6420**

E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Oil & Grease	EPA 1664A	General Chemistry	NELAP	2/5/2002
Orthophosphate as P	SM 4500-P E	General Chemistry	NELAP	12/1/2011
Pentachlorophenol	EPA 625	Extractable Organics	NELAP	2/5/2002
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
Perthane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
pH	EPA 150.1	General Chemistry	NELAP	12/12/2005
pH	EPA 9040	General Chemistry	NELAP	12/12/2005
pH	SM 4500-H+-B	General Chemistry	NELAP	2/24/2009
Phenanthrene	EPA 625	Extractable Organics	NELAP	2/5/2002
Phenanthrene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Phenol	EPA 625	Extractable Organics	NELAP	2/5/2002
Phenol	EPA 8270	Extractable Organics	NELAP	4/1/2004
Phosphorus, total	SM 4500-P E	General Chemistry	NELAP	12/1/2011
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Potassium	EPA 200.7	Metals	NELAP	2/5/2002
Potassium	EPA 6010	Metals	NELAP	4/1/2004
Potassium	SM 3120 B	Metals	NELAP	2/24/2009
Pyrene	EPA 625	Extractable Organics	NELAP	2/5/2002
Pyrene	EPA 8270	Extractable Organics	NELAP	4/1/2004
Pyridine	EPA 8270	Extractable Organics	NELAP	4/1/2004
Residue-filterable (TDS)	SM 2540 C	General Chemistry	NELAP	12/1/2011
Residue-nonfilterable (TSS)	SM 2540 D	General Chemistry	NELAP	2/24/2009
Residue-settleable	SM 2540 F	General Chemistry	NELAP	2/24/2009
Residue-total	SM 2540 B	General Chemistry	NELAP	2/24/2009
Residue-volatile	EPA 160.4	General Chemistry	NELAP	2/5/2002
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Selenium	EPA 200.7	Metals	NELAP	2/24/2009
Selenium	EPA 200.9	Metals	NELAP	2/5/2002
Selenium	EPA 6010	Metals	NELAP	2/24/2009
Selenium	EPA 7010	Metals	NELAP	12/1/2011
Selenium	SM 3120 B	Metals	NELAP	2/24/2009
Silica as SiO2	EPA 200.7	Metals	NELAP	12/3/2014
Silver	EPA 200.7	Metals	NELAP	2/5/2002
Silver	EPA 6010	Metals	NELAP	4/1/2004

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Environmental Quality Laboratories, Inc. - PR
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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Silver	EPA 7010	Metals	NELAP	12/1/2011
Silvex (2,4,5-TP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
Sodium	EPA 200.7	Metals	NELAP	2/5/2002
Sodium	EPA 6010	Metals	NELAP	2/24/2009
Sodium	SM 3120 B	Metals	NELAP	2/24/2009
Strontium	EPA 200.7	Metals	NELAP	2/24/2009
Strontium	EPA 6010	Metals	NELAP	2/24/2009
Styrene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Sulfate	ASTM D516-90	General Chemistry	NELAP	2/24/2009
Surfactants - MBAS	SM 5540 C	General Chemistry	NELAP	2/24/2009
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Tetrachloroethylene (Perchloroethylene)	EPA 624	Volatile Organics	NELAP	2/5/2002
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	4/1/2004
Thallium	EPA 200.7	Metals	NELAP	2/24/2009
Thallium	EPA 200.9	Metals	NELAP	2/24/2009
Thallium	EPA 6010	Metals	NELAP	2/24/2009
Thallium	EPA 7010	Metals	NELAP	12/1/2011
Thallium	SM 3120 B	Metals	NELAP	2/24/2009
Toluene	EPA 624	Volatile Organics	NELAP	2/5/2002
Toluene	EPA 8260	Volatile Organics	NELAP	4/1/2004
Total cyanide	EPA 9012	General Chemistry	NELAP	4/1/2004
Total cyanide	EPA 9014	General Chemistry	NELAP	4/1/2004
Total organic carbon	SM 5310 C	General Chemistry	NELAP	12/1/2011
Total phenolics	EPA 420.4	General Chemistry	NELAP	12/1/2011
Total phenolics	EPA 9066	General Chemistry	NELAP	7/1/2003
Toxaphene (Chlorinated camphene)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/5/2002
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	4/1/2004
trans-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	2/5/2002
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	4/1/2004
trans-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	12/12/2005
trans-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	12/12/2005
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Trichloroethene (Trichloroethylene)	EPA 624	Volatile Organics	NELAP	2/5/2002
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	4/1/2004

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Trichlorofluoromethane	EPA 624	Volatile Organics	NELAP	2/5/2002
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	4/1/2004
Vanadium	EPA 200.7	Metals	NELAP	2/5/2002
Vanadium	EPA 6010	Metals	NELAP	4/1/2004
Vanadium	SM 3120 B	Metals	NELAP	2/24/2009
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	4/1/2004
Vinyl chloride	EPA 624	Volatile Organics	NELAP	2/5/2002
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	4/1/2004
Xylene (total)	EPA 624	Volatile Organics	NELAP	2/5/2002
Xylene (total)	EPA 8260	Volatile Organics	NELAP	4/1/2004
Zinc	EPA 200.7	Metals	NELAP	2/5/2002
Zinc	EPA 6010	Metals	NELAP	2/5/2002
Zinc	SM 3120 B	Metals	NELAP	2/24/2009

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	12/1/2011
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
1-Chlorohexane	EPA 8260	Volatile Organics	NELAP	12/1/2011
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	12/1/2011
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	7/1/2009

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	7/1/2009
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	12/1/2011
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2009
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2009
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	12/1/2011
2-Hexanone	EPA 8260	Volatile Organics	NELAP	7/1/2009
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	7/1/2009
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2009
3,5-Dichlorobenzoic acid	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
3/4-Methylphenols (m/p-Cresols)	EPA 8270	Extractable Organics	NELAP	7/31/2009
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	7/1/2009
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	7/1/2009
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	12/1/2011
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	12/1/2011
4-Nitrophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
Acenaphthene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Acetone	EPA 8260	Volatile Organics	NELAP	7/1/2009
Acifluorfen	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	12/1/2011
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	12/3/2014
Aluminum	EPA 6010	Metals	NELAP	7/1/2009
Anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Antimony	EPA 6010	Metals	NELAP	7/1/2009

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Arsenic	EPA 6010	Metals	NELAP	7/1/2009
Barium	EPA 6010	Metals	NELAP	7/1/2009
Bentazon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Benzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Benzidine	EPA 8270	Extractable Organics	NELAP	7/1/2009
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Beryllium	EPA 6010	Metals	NELAP	7/1/2009
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	7/1/2009
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	7/1/2009
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	7/1/2009
Bromobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	12/1/2011
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
Bromoform	EPA 8260	Volatile Organics	NELAP	7/1/2009
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2009
Cadmium	EPA 6010	Metals	NELAP	7/1/2009
Calcium	EPA 6010	Metals	NELAP	7/1/2009
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	7/1/2009
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	7/1/2009
Chloramben	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Chloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2009

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Analyte	Method/Tech	Category	Certification Type	Effective Date
Chloroform	EPA 8260	Volatile Organics	NELAP	7/1/2009
Chromium	EPA 6010	Metals	NELAP	7/1/2009
Chrysene	EPA 8270	Extractable Organics	NELAP	7/1/2009
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2009
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Cobalt	EPA 6010	Metals	NELAP	7/1/2009
Corrosivity (pH)	EPA 9040	General Chemistry	NELAP	7/1/2009
Dacthal (DCPA)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	12/1/2011
Dibromomethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	12/1/2011
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	7/31/2009
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2009
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2009
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2009
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	7/31/2009
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	EPA 8260	Volatile Organics	NELAP	12/1/2011
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Fluorene	EPA 8270	Extractable Organics	NELAP	7/1/2009
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Gasoline range organics (GRO)	EPA 8015	Extractable Organics	NELAP	7/31/2009

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	7/1/2009
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	12/1/2011
Iron	EPA 6010	Metals	NELAP	7/1/2009
Isophorone	EPA 8270	Extractable Organics	NELAP	7/1/2009
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Lead	EPA 6010	Metals	NELAP	7/1/2009
Lead	EPA 7010	Metals	NELAP	12/3/2014
Magnesium	EPA 6010	Metals	NELAP	7/1/2009
Manganese	EPA 6010	Metals	NELAP	7/1/2009
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Mercury	EPA 7471	Metals	NELAP	12/3/2014
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Methylene chloride	EPA 8260	Volatile Organics	NELAP	7/1/2009
Molybdenum	EPA 6010	Metals	NELAP	7/1/2009
Naphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2009
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Nickel	EPA 6010	Metals	NELAP	7/1/2009
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2009
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	12/1/2011
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	7/1/2009
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	7/1/2009
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Oil & Grease	EPA 9071	General Chemistry	NELAP	7/1/2009
Paint Filter Liquids Test	EPA 9095	General Chemistry	NELAP	7/31/2009

Laboratory Scope of Accreditation

Attachment to Certificate #: E87783-35, expiration date June 30, 2016. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87783 **EPA Lab Code: PR00014** **(787) 288-6420**

E87783
Environmental Quality Laboratories, Inc. - PR
Parque Industrial Minillas
60 Calle E
Bayamon, PR 00956

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Pentachlorophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
pH	EPA 9045	General Chemistry	NELAP	7/1/2009
Phenanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Phenol	EPA 8270	Extractable Organics	NELAP	7/1/2009
Picloram	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Potassium	EPA 6010	Metals	NELAP	7/1/2009
Pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2009
Pyridine	EPA 8270	Extractable Organics	NELAP	7/1/2009
Reactive cyanide	Sec. 7.3 SW-846	General Chemistry	NELAP	7/1/2009
Reactive sulfide	Sec. 7.3 SW-846	General Chemistry	NELAP	7/1/2009
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Selenium	EPA 6010	Metals	NELAP	7/1/2009
Silver	EPA 6010	Metals	NELAP	7/1/2009
Sodium	EPA 6010	Metals	NELAP	7/1/2009
Strontium	EPA 6010	Metals	NELAP	7/1/2009
Styrene	EPA 8260	Volatile Organics	NELAP	7/1/2009
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	12/1/2011
Thallium	EPA 6010	Metals	NELAP	7/1/2009
Titanium	EPA 6010	Metals	NELAP	7/1/2009
Toluene	EPA 8260	Volatile Organics	NELAP	7/1/2009
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2009
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2009
trans-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2009
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	12/1/2011
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2009
Vanadium	EPA 6010	Metals	NELAP	7/1/2009
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	7/1/2009
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	7/1/2009
Xylene (total)	EPA 8260	Volatile Organics	NELAP	7/1/2009
Zinc	EPA 6010	Metals	NELAP	7/1/2009

APPENDIX 2

SOP - DRILLING AND SOIL SAMPLING USING A HAND AUGER

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE FOR SURFACE AND SUBSURFACE SOIL SAMPLE ACQUISITION USING A HAND-AUGER OR CORE SAMPLER

Prepared for ERTEC, P.S.C. – Environmental Consultants
PO Box 195336
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Author:	Luz Martínez, EIT	10-6-2010 Date
Technical Reviewer:	by David Cook, PG	10/6/2010 Date
Quality Assurance Officer:	Oscar L. Fontán, PG	10-6-10 Date

Effective Date: October 6, 2010

CAUTION

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ERTEC

1.0 Purpose

The purpose of this Standard Operating Procedure (SOP) is to describe the proper procedures used to advance a borehole and collect surface or shallow (less than eight (8) feet in depth) subsurface soil samples using a hand-auger. The person directing this activity should be a geologist or an engineer.

2.0 Applicability

Subsurface and shallow soil samples are collected using a stainless steel 3-inch diameter hand auger at those locations where access limitations exist, where proposed drilling locations may intercept underground utilities or other underground structures, and at locations where samples to depths of less than eight (8) feet are to be taken. Hand augers can be used in areas where unconsolidated materials are present. Rock, stiff clays and coarse gravel will inhibit or greatly limit the depth to which a hand auger can be used.

Samples are collected continuously to the required depth or until refusal to hand-auger penetration is encountered. Refusal to hand-auger penetration is considered to be when the hand-auger will not advance if rotated and pushed downward at the same time by the technician or driller. A portion of each soil sample collected from the hand-auger boring will be screened for volatile organic compounds (VOCs) in the field using the jar headspace method described below. The remaining portion of each sample will be used for laboratory analysis.

In locations where an underground pipeline or other structure is suspected to be present, the hand-auger can be used for borehole clearance purposes. The borehole will be drilled into the soil with a hand-auger to a depth of up to eight (8) feet. Then, if no obstacle is encountered, drilling operations can be continued in the same borehole using the required drilling technique until the desired depth is reached.

3.0 Material and Equipment

- Stainless steel hand-auger with extensions
- Stainless steel spoon, trowel or spatula
- Shovel (to remove gravel and debris)
- Stainless steel bowl
- OVA-PID meter
- Aluminum foil
- Sampling jars and labels

- Cooler
- Polyethylene sheeting
- Logbook
- Chain-of-custody form
- Indelible ink pen
- Boring log form
- Camera
- Watch
- 200-foot tape
- Site Health and Safety Plan (HASP)
- Decontamination equipment as needed

4.0 Procedure

4.1 Place equipment and supplies protected on clean polyethylene sheeting or on a portable table.

4.2 Wear appropriate personal protective equipment (PPE) as outlined in the Health and Safety Plan (HASP). Personnel responsible for sampling will wear new gloves before sampling.

4.3 Use a decontaminated 3-in diameter stainless steel hand auger.

4.4 Once the soil unit to be bored is exposed, by removing asphalt, concrete, loose soil and other debris, begin turning the auger or core sampler in a clockwise direction and continue until the auger bucket is filled with soil.

For Field Screening Samples

4.5 Remove and place the hand-auger on clean polyethylene sheeting. Collect the sample for field screening directly from the hand-auger bucket to a sample jar using a decontaminated stainless steel spoon or spatula.

4.6 Fill approximately ½ of the sample jar with soil for field screening. Immediately cover the jar mouth with aluminum foil and replace cap tightly.

4.7 Allow approximately 10 minutes for VOCs to partition into the headspace.

4.8 Introduce the PID probe tip through the aluminum foil cover and record the reading in the field logbook.

4.9 Discard the headspace analysis jars into the 55-gallon drum being used for collection of drill cuttings.

4.10 Repeat steps 4.3 to 4.9 until the desired depth is obtained or until refusal.

For Laboratory Analysis Samples

4.11 Soil samples for laboratory analysis, with the exception of those for Volatile Organic Compound (VOC) Analysis, should be homogenized by vigorous mixing of the entire auger bucket contents in a stainless steel bowl with stainless steel spoons before being place into containers. VOC samples must be taken as discrete samples directly from the center of the hand-auger bucket and transferred to sample containers immediately after the sample is retrieved to avoid volatilization.

Homogenization of non-VOC samples will be conducted as follows:

First, remove rocks, twigs, leaves and other debris if they are not considered part of the sample. The sample will be removed from the auger bucket and placed in a decontaminated stainless steel bowl and the thoroughly mixed using a stainless steel spoon. The soil will be scraped from the sides, corners and bottom of the bowl, quartered, and moved to the four corners of the bowl. Each quarter of the sample will be mixed individually, moved to the center of the bowl, and the entire sample mixed again.

4.12 Fill the sample jars with soil using a decontaminated stainless steel spatula or spoon. Any remaining sample will be discarded into the 55-gallon drum used for the collection of drill cuttings.

4.13 Place the laboratory analysis sample containers in a cooler with ice.

4.14 The hand-auger and spatula/spoon will be decontaminated initially and between each sample following the procedure presented in the **SOP for Equipment Decontamination**.

4.15 Repeat steps 4.14 to 4.16 until all required samples are obtained.

4.16 Fill out the sample log sheet, labels, custody seals and Chain-of-Custody forms for analytical samples.

5.0 Documentation

5.1 Only one project will be documented in a given logbook. The same logbook may be used for more than one sampling location, or sampling activity.

5.2 The first five (5) pages should be left blank for index, notes, etc.

5.3 Sign and date each page.

5.4 The last five (5) pages must be used for recording calibration data. Use the page number or a separate record identified as "Cal. Reference Number" to refer to each calibration.

5.5 The data obtained in each boring will be recorded in the field logbook and boring log and will include the following:

- Date of start and completion of boring,
- Identifying number of boring,
- Soil boring location,
- Type and size of auger used,
- Depth of changes in strata,
- Description of soil in each major stratum, including color, odor, grain size and moisture content,
- Sample depth,
- Sample recovery,
- Ground water elevation and location of seepage zones, if encountered,
- The presence or absence of sheen on groundwater,
- PID field screening results,
- Condition of augered hole upon removal of auger, whether the hole remains open or the sides cave when such can be observed.

5.6 The logbook should be kept in the possession of the field geologist or engineer.

6.0 Calibration

Refer to the **SOP: Photoionization Air Monitor Calibration** or to the PID manufacturer's calibration instructions.

7.0 Precautions

Wear gloves when collecting soil samples. Be sure to consult the HASP for the applicable dermal and respiratory protection before collecting samples.

Although incidental odors should be noted in the logbook, it is unwise from a health and safety standpoint to routinely "sniff test" samples for contaminants.

8.0 References

U.S. EPA, 1987. **Compendium of Superfund Field Operations Methods,** EPA/540/P-87/001.

ASTM 1980 (1995). **Standard Practice for Soil Investigation and Sampling by Auger Borings,** D 1452.

ASTM 1991. **Standard Guide for Soil Sampling from the Vadose Zone**, D 4700.

APPENDIX 3

SOP - DRILLING AND SOIL SAMPLING USING A ROTARY DRILL RIG WITH HOLLOW-STEM AUGERS

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE FOR SUBSURFACE SOIL SAMPLE ACQUISITION

Prepared for ERTEC, P.S.C. – Environmental Consultants
PO Box 195336
San Juan, Puerto Rico 00919-5336
(787) 792-8902

Author:	Luz E. Martínez, EIT	10-6-2010 Date
Technical Reviewer:	David K. Cook, PG	10/6/2010 Date
Quality Assurance Officer:	Oscar L. Fontán, PG	10/6/10 Date

Effective Date: October 6, 2010

CAUTION

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ERTEC

1.0 Purpose and Introduction

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the collection of subsurface soil samples to define the subsurface conditions at a site. Soil includes soil, unconsolidated sediment or weakly consolidated sediment. Samples are collected using a rotary rig with hollow-stem augers and split-spoon samplers or a GeoProbe using plastic tubes. In both cases, the sampling tool is driven into the ground to obtain the soil samples. To obtain surface samples, refer to the **SOP for Surface Soil Sampling**.

Obtaining soil samples using a rotary rig with hollow-stem augers involves the driving of a split-spoon sampler by hammer blows ahead of a drill bit. Standard split-spoons are 1.7 inches in diameter and 18 or 24 inches long. The number of hammer blows is recorded and can provide strength characteristics of the soil. A 140-pound hammer is dropped a distance 30 inches to obtain the number of blows required to advance the sampler 6 inches. The sampler is brought to the surface where it is separated longitudinally, and the soil sample can be described and sampled.

Obtaining soil samples using a GeoProbe involves the driving of a 5-foot long plastic tube into the ground. The plastic tube is brought to the surface where it is cut open longitudinally, and the continuous soil sample can be described and sampled. A detailed description of this process is contained in the SOP for **Subsurface Soil Sample Acquisition using a Model 6600 GeoProbe**.

The person directing this activity should be a geologist or an engineer.

2.0 Sampling Acquisition

Subsurface soil samples are collected from soil borings drilled at the locations pre-selected in the Project Sampling and Analysis Plan or at locations selected in the field based on field conditions. Usually, one boring is drilled at each sampling location.

When a rotary rig with hollow-stem augers and split-spoon samplers is used, samples are either taken at five-foot intervals (one split spoon sample per five feet of depth) or continuously (one split spoon sample per two feet of depth). A portion of each soil sample collected from the boring is screened for volatile organic compound (VOC) content in the field, using an Organic Vapor Analyzer (OVA) equipped with a photo ionization detector (PID) using the jar headspace method described below. In most cases, the depths of samples for laboratory analyses are pre-determined in the Sampling and Analysis Plan (either at a specific depth below ground surface or at a specific location such as at the ground surface or at the depth of the water table). The

samples for analysis are collected from the remaining portions of soil samples (the portions not used for field screening). In some cases, samples for laboratory analysis are selected from depths within a given soil boring based on the results of the headspace screening and physical characteristics of the samples (odor, color, etc.).

When a GeoProbe is used, continuous samples are obtained for each 5-foot depth interval. After the plastic sampling tubes are opened, PID measurements are taken at one-foot intervals from notches cut into the soil sample. Samples for laboratory analysis are then collected as for auger rig/split spoon sampling.

In some cases, in response to a specific regulatory requirement, two soil borings may drilled at each sampling location. The first boring will provide samples for PID field screening and observation of physical characteristics. The second boring will be drilled adjacent to the first (within 1 to 2 feet) to the specific depths were samples will be collected for laboratory analyses based on the field screening and the field characteristics.

3.0 Materials and Equipment List

The following equipment is required in the field for subsurface soil sample collection:

- Sampling equipment (rotary auger rig or GeoProbe) and associated equipment
- Stainless steel spoons or spatulas
- Pocket knife
- Stainless steel bowl
- OVA-PID meter
- Aluminum foil
- Sampling jars
- Polyethylene sheeting
- Project Logbook
- Chain-of-custody form
- Indelible ink pen
- Color chart
- Grain-size chart
- Boring log form
- Decontamination equipment (see **SOP for Equipment Decontamination)**

4.0 Procedure

4.1 Sampling with a GeoProbe

4.1.1 Wear appropriate personal protective equipment (PPE) as required in the Project Health and Safety Plan (HASP).

4.1.2 Drilling equipment must be decontaminated before commencing field work and after each soil boring location in accordance with the **SOP for Equipment Decontamination**.

4.1.3 Drill each borehole to the desired sampling depth or until refusal is encountered using the GeoProbe following the **SOP for Soil Sample Acquisition using a Model 6600 GeoProbe.** The GeoProbe will provide continuous samples in 5-foot sections of plastic tubing.

4.1.4 Bring the sample tubes to the surface and place them on clean polyethylene sheeting, usually on a portable folding table.

4.1.5 Open the sampling tubes with a tube cutter.

4.1.6 With a stainless steel spatula, trim the upper portion of loose material from each sample and discard it.

4.1.7 Turn the PID on and calibrate it in accordance with the instructions for the instrument being used.

4.1.8 Because a limited amount of sample is available for preparation of laboratory analysis samples, field screening will be performed by cutting a notch in the continuous sample at one-foot intervals using a pocket knife.

4.1.9 Place the PID probe carefully in each notch and record the field screening measurements in the Project Logbook.

4.1.10 Record observations of the physical characteristics of the entire sample including color, odor, grain size and moisture content and record as a boring log in the Project Logbook.

4.1.11 Select samples for laboratory analysis either from the depth intervals specified in the Project Sampling and Analysis Plan or based on PID screening results and physical characteristics.

4.1.12 Collect samples for VOC analysis first to prevent loss by volatilization.

4.1.13 Fill the sample jars with soil using a decontaminated stainless steel spatula or spoon. Remaining sample material and used sampling tubes will be discarded into a properly-labeled 55-gallon drum.

4.1.14 Place the analytical samples in a cooler with ice.

4.1.15 The spatula/spoon will be decontaminated between each sample following the procedure provided in the **SOP for Equipment Decontamination.**

4.1.16 Complete the sample log sheet, labels, custody seals and Chain-of-custody forms for the analytical samples.

Items 4.1.5 through 4.1.13 are to be completed as quickly as possible to avoid loss of VOCs from the sample cores.

4.2 Sampling with Hollow-Stem Augers

4.2.1 A split-spoon sampler is driven into the undisturbed soil to be sampled with blows from a 140-pound hammer falling 30 inches until the desired depth interval has been penetrated (two feet for continuous sampling or five feet) or until 50 blows are required to penetrate less than 6 inches.

4.2.2 A decontaminated split-spoon will be used for each sample collected for chemical analysis.

4.2.3 Record the number of blows required for each 6 inches of penetration or fraction thereof. If less than 6 inches is penetrated, the log should state the number of blows and the number of inches penetrated.

4.2.4 Bring the split-spoon to the surface and remove both ends and one half of the split-spoon so that the recovered soil rests in the remaining half of the sampler.

4.2.5 Place the split-spoon on clean polyethylene sheeting.

4.2.6 Trim the sample core with a clean stainless steel spatula or spoon to remove loose surface material.

For the collection of samples for laboratory analysis, follow Steps 4.1.7 through 4.1.16 under sampling with a GeoProbe. For collection of samples for field screening with the PID, use the following procedure:

4.2.7 Fill approximately one-half of a sample jar with soil from the sample core using a decontaminated stainless steel spatula or spoon.

4.2.8 Immediately cover the jar mouth with aluminum foil and replace the cap tightly. Remaining sample is to be discarded into the 55-gallon drum used for the collection of drill cuttings.

4.2.9 Turn on the PID and calibrate it in accordance with the manufacturer's instructions for the instrument being used.

4.2.10 Allow approximately 10 minutes for the VOCs to partition into the headspace.

4.2.11 Introduce the PID probe tip through the aluminum foil cover and record the reading in the field logbook.

4.2.12 Discard the headspace analysis jars into the 55-gallon drum being used for the collection of drill cuttings.

5.0 Documentation

5.1 One logbook will be used for each project site. The same logbook may be used for more than one sampling location.

5.2 The first five (5) pages should be left blank for index, notes, etc.

5.3 Sign and date each page.

5.4 The last five (5) pages must be used to record OVA-PID meter calibration data. Use the page number or a separate record identified as "Cal. Reference Number" to refer to each calibration.

5.5 The following information will be recorded in the field logbook:

- Soil boring location
- Sample identification
- Sample depth
- Percentage of sample recovery
- Lithology
- Color
- Grain size
- Inclusions
- The presence of staining, odor or sheen
- Blow counts
- OVA-PID readings

5.6 The logbook should be kept in possession of the field geologist or engineer.

6.0 Calibration

Refer to **SOP: Photoionization Air Monitor Calibration** for OVA-PID calibration procedure.

7.0 Precautions

Wear gloves when collecting soil samples. Be sure to consult the Project HASP for the applicable dermal and respiratory protection before collecting samples.

Note: that although incidental odors should be noted in the logbook, it is unwise from a health and safety standpoint to routinely "sniff test" samples for contaminants.

8.0 References

U.S. EPA, 1987. **A Compendium of Superfund Field Operations Methods,** EPA/540/P-87/001.

ASTM 1984 (1992). **Test Method for Penetration Test and Split Barrel Sampling of Soils**, D 1586.

APPENDIX 4

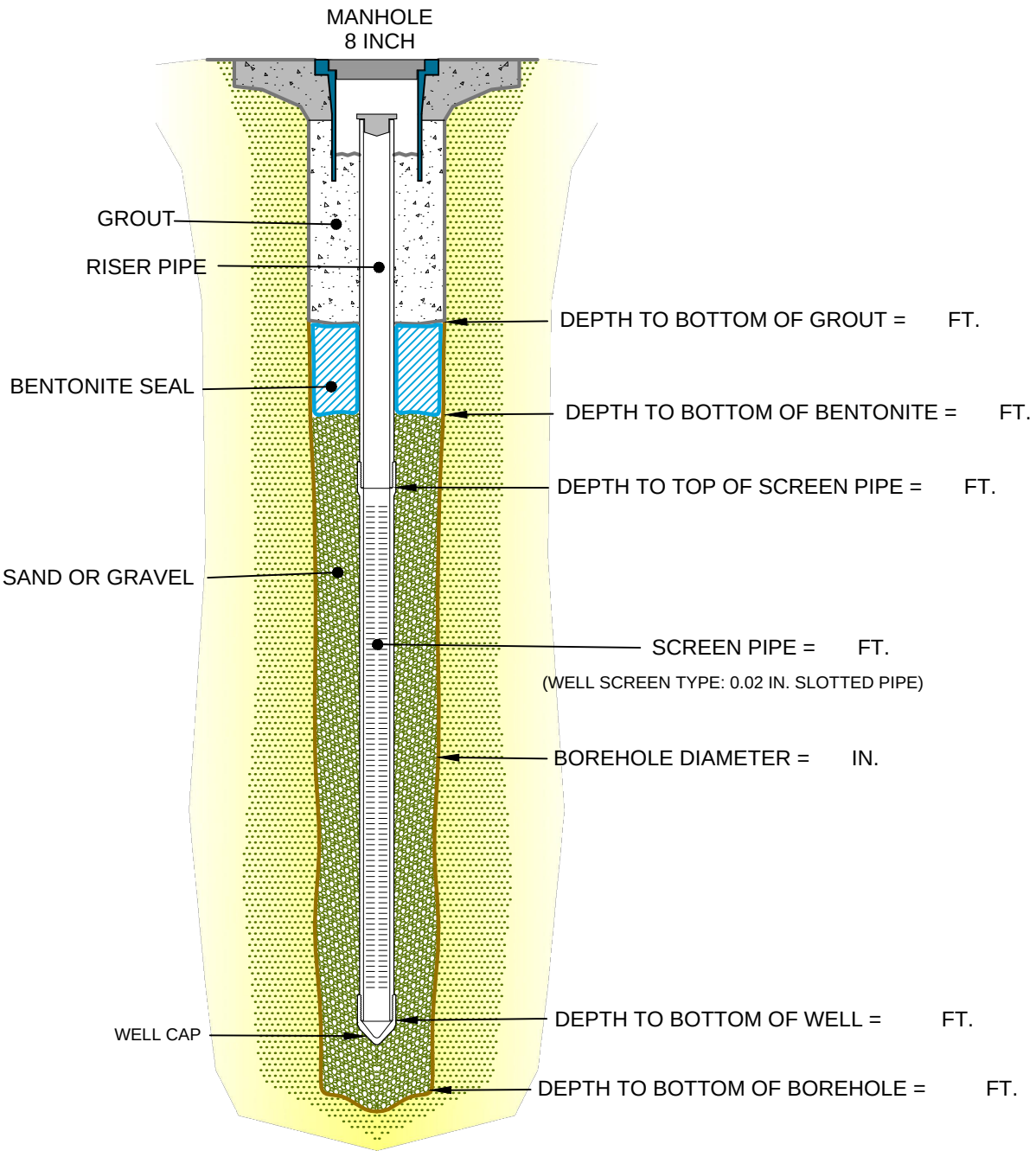
GENERIC MONITORING WELL CONSTRUCTION DIAGRAM

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

WELL CONSTRUCTION DETAIL

PROJECT NAME:		WELL ID:	
LOCATION:		BEGIN DATE:	
CLIENT:		FINISH DATE:	
JOB NO.:		WELL PURPOSE:	MONITORING
FIELD PERSON:		DRILLER:	
MANHOLE TYPE:	FLUSH	MEASURE BASE AT:	GROUND LEVEL
UNIT:	FEET	WELL DIAMETER:	2 INCHES.



APPENDIX 5

SOP – PREPARATION OF FIELD QUALITY CONTROL SAMPLES

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE
SAMPLE QA/QC

Prepared for ERTEC, P.S.C. – Environmental Consultants
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Author: Luz E. Martinez, EIT — Date: 8/26/10

Technical Reviewer: Dave Cook, PG — Date: 8/26/10

Quality Assurance Officer: Wanda Morales, PG — Date: 8/26/10

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1.0 OBJECTIVE

The objective of the sampling QA/QC program is to ensure the reliability and integrity of all data and documentation generated as part of the sampling program. Major elements of the program are quality control sampling, sample custody and handling, and field-generated data management.

2.0 QUALITY CONTROL SAMPLES

Quality control (QC) samples must be collected to verify that sample collection and handling procedures were performed adequately and that they have not compromised the quality of the samples. There are five primary areas of concern for quality assurance (QA) in the collection of representative samples:

1. Obtaining a sample that is representative of the aquifer or zone of interest in the aquifer (groundwater) or that is representative of the unconsolidated or consolidated formation of interest (soil/rock). Verification for groundwater samples is based on the field log documenting that the field water-quality parameters stabilized during the purging of a well prior to sample collection. Verification for soil samples is based on selecting samples that are physically uniform in color, texture, grain size, odor and field screening results.
2. Ensuring that the sampling equipment (well construction materials, purging and sampling equipment such as bailers and tubing for groundwater and drilling tools, trowels, spoons, etc. for soils) are made of materials and used in a manner that will not interact with or alter the analyses of the samples.
3. Ensuring that the results generated by the sampling procedures are reproducible; therefore the sampling program should include co-located duplicate samples.
4. Preventing cross-contamination. Sampling should proceed from the locations anticipated to be the least contaminated to those expected to be the most contaminated based on the study of available information regarding the study area. Field equipment blanks should be included in all sampling programs and proper and careful decontamination of sampling equipment is required. Various types of blanks are used to check the cleanliness of field sampling equipment. These include field blanks (equipment and trip blanks). Other QA samples include spike samples and the duplicates mentioned above.
5. Samples must be properly preserved, packaged and shipped to the analytical laboratory.

2.1 Field Duplicate Samples

Duplicate samples are collected by taking separate samples as close to each other in time and space and physical characteristics as is practical. Duplicate samples are used to develop criteria for acceptable variations in the physical and chemical composition of samples that can result form sampling procedures. They give an indication of the precision of the sampling and analytical methods used.

1. For both soil and groundwater, one field duplicate sample will be collected and analyzed for every ten samples submitted to the laboratory, or one duplicate sample will be collected each day when at least 3 environmental samples are collected. Care must be taken to ensure that each sample and its duplicate can be considered as a homogeneous sample split in two. This requires that the samples be taken at the same time from the same location, and in the case of soil samples, the samples must be homogenized (mixed) carefully in a container that will not interact with or alter the analyses of the samples.

2. A field duplicate sample will be given a different sample identification from the original sample so that it is not identified in the laboratory as a duplicate sample. The field duplicate will be entered on the chain-of- custody form as if it is a separate sample.

2.2 Field Equipment Samples

1. Field Blanks Field blanks consist of deionized water, are prepared in the field, and are preserved and handled in the same manner as regular samples. The results of the field blank analyses are compared against deionized water; and therefore, should exhibit levels below detection for all parameters. Detections of various parameters in field blanks can indicate the introduction of outside contaminants during the sampling process or from sampling equipment and supplies. Procedures are:

    a. Obtain an adequate supply of distilled, deionized (DDI) water from the analytical laboratory in clean gallon containers.
    b. Expose the DDI water in the sample container by opening it during the sampling event
    c. Close the container.
    d. Handle the field blanks in the same manner as the regular samples.
    e. Properly label the field blanks with an FB prefix
    f. Collect one field blank for every 10 regular samples or one field blank each day when at least 3 samples are collected.

2. Field Equipment Blanks Field equipment blanks (equipment rinsate blanks) are used if a sampling device is used and are taken to evaluate the likelihood, amount and type of contamination that may be introduced into samples by the sampling device. Equipment blanks allow for a cross check and, in some cases, quantitative correction for imprecision that can arise by improper handling, preservation or cleaning procedures. Procedures are:

   a. For a soil sampling event, after the sampling device has been cleaned, pour DDI water over and through the equipment so that the rinsate flows directly into the sample container(s).
   b. For a ground water sampling event, fill the sampling device with DDI water and pump or drain the DDI water from the device and fill the sample container(s) in the same manner as the regular samples.
   c. Label the sample containers with an EB prefix.
   d. Collect at least one equipment blank for every 10 regular samples or one equipment blank each day when at least 3 samples are collected.
   e. The equipment blank will be analyzed for the same parameters as the regular samples collected on that day.

3. Trip Blanks Trip blanks consist of DDI water, prepared at the laboratory immediately before leaving on a sampling run. The trip blanks are placed in the shuttle that will be filled by other samples. The trip blanks are handled in the same manner as the other samples. Detections of various parameters in trip blanks can indicate introduction of outside contaminants during sample handling in the field or from containers. Procedures are:

   a. Trip blanks will be transported to the site and will accompany the regular samples collected on a given day in a given shuttle.
   b. Do not open the trip blanks during site sampling and transportation.
   c. Label the trip blank containers with a TB prefix.
   d. Handle the samples in the same manner as the regular samples.
   e. Collect one trip blank per shuttle.

   The DDI water used for field equipment blanks must be provided by the laboratory. Analytical results for this water will be submitted by the laboratory.

2.3 Matrix Spike Samples

Matrix spike samples are samples into which a known amount of material is introduced by the analytical laboratory that will produce a known concentration of a certain parameter in the analysis of that sample. The known concentration in a spike sample should provide a parameter concentration a known amount higher (generally 30% to 500%) than that parameter in the regular sample. The results of the spike sample analysis are then compared to the known concentration. Procedures are:

1. One matrix spike and one matrix spike duplicate (MS and MSD) should be prepared for each sample delivery group.
2. Label spikes in a manner that conceals their purpose.
3. Spikes should be handled in the same manner as all other samples.
4. Triple sample volumes will be collected for each aqueous MS/MSD analysis conducted for extractable organics and VOCs.
5. A double sample volume will be collected for each aqueous MS/MSD analysis conducted for inorganics.

2.4 Drilling Water

One sample of the water to be used during drilling and well installation will be analyzed for the same parameters than the environmental samples.

3.0 SAMPLE CUSTODY

1. The sampling team will be responsible for maintaining custody of samples until they are delivered to the courier for shipment to the laboratory. All samples shipped to the laboratory will be accompanied by the laboratory Chain-of-Custody Record (Attachment A). The Chain-of-Custody Record will be completed in the field; the original form will accompany the shipment and a copy will be retained in the field project file. The Chain of-Custody will include signatures of personnel who participated in collecting the samples. Each sample container and the following corresponding information for each container will be listed:

    a. Date and time of sample collection
    b. Sample identification
    c. Sample matrix
    d. Sample type (grab, composite, blank)
    e. Requested analysis
    f. Chemical preservatives and pH achieved (if applicable)
    g. Number of containers
    h. Sampler's and receiver's signatures
    i. Any special instructions required.

2. The original Chain-of-Custody Record will be placed in a plastic bag and taped to the underside of the cooler lid.
3. Samples will be placed in a clean, dry, undamaged shuttle specially prepared by ERTEC. Sufficient ice packs will be placed in each cooler to ensure that sample temperature is maintained at approximately 4 degrees C until arrival at the laboratory. The ice packs will be distributed in the cooler as indicated by the laboratory procedures. Packaging and shipment of samples will be performed in accordance with USEPA's "User's Guide to the Contract Laboratory Program" (January 1991).
4. A sample seal will be secured to the cap or lid of each sample container prior to shipment. Sample seals will not be used on sample containers for volatile organic analysis. Sample seals will include sample number identification, date of sampling, and sampler's signature.
5. To provide a means of detecting potential tampering during shipment, all shipment containers (coolers) will have numbered custody seals. At least two seals will be affixed to each shipment container in locations that would result in damage to the seals when opened. Sampling personnel will keep a record of the custody seal numbers, and the analytical laboratory will inform ERTEC of the status of the custody seals when the shipment arrives.
6. The courier service utilized for sample shipment and the number which identifies each shipment will be recorded on the Chain-of-Custody form. A receipt from the courier service or copy of the air bill that identifies each shipment will be retained in the field project file. Samples collected during a day's sampling will be sent for next day delivery to the analytical laboratory via an overnight courier.

4.0 FIELD-GENERATED DATA MANAGEMENT

1. Field data will be recorded in a bound field logbook that will contain field activity logs, water-sampling logs, field instrument calibration logs and chain of custody forms. Field activity logs will have a description of the kind of activities performed during the day, time of activities, personnel on-site, weather conditions, amount and type of samples collected, chain-of-custody identification numbers, and custody seal numbers.

2. Field procedures, measurements, and observations will be described in sufficient detail, so as to enable others to easily reconstruct the field events. Included will be physical descriptions of samples (color, odor, texture, grain size, moisture content), a site sketch showing sampling locations, well purging stabilization measurements and field analytical screening measurements

3. The project manager will maintain all project documentation in a central project file. This file will include the following:

   a. Project plans and specifications
   b. Project set-up forms
   c. Client communications
   d. Agency communications
   e. Field data and documentation
   f. Chain-of-Custody documentation
   g. Sample identification documents
   h. Sample bottle certificates
   i. Field screening results
   j. Laboratory data packages
   k. Analyte-free water data results
   l. Data review notes
   m. Report notes and calculations
   n. Draft reports
   o. Final report with maps and drawings

5.0 ANALYTICAL DATA MANAGEMENT

1. Analytical data packages received from the contract laboratory will be compared with the list of analyses requested on the Chain-of-Custody record to ensure all analyses were performed.

2. Instrument detection limits will be checked by the PM to make sure they are adequate and appropriate.

3. The date of analysis will be checked by the PM to make sure it is within required holding times.

4. The laboratory report will be checked by the PM to identify obvious problems with QA/QC samples such as parameter detections in blanks and inconsistent results between duplicates.

5. The laboratory should be contacted immediately by the PM if problems are detected to identify the causes.

6. Analytical data received from the contract laboratory (magnetic media or hardcopy) will be validated, reduced, and reported by a third party to be determined. When the party is selected, the name of the person that will be performing the data validation and his or her resume will be submitted to the Client for approval.

7. The validation report will be reviewed by the PM to identify potential problems with the analytical results. These problems should be immediately discussed with the laboratory to identify the causes.

ATTACHMENT A

TYPICAL CHAIN OF CUSTODY

CHAIN OF CUSTODY

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PROJECT NAME:	SAMPLED BY (PRINT):
PROJECT NUMBER:	SAMPLER SIGNATURE:
LOCATION:	PROJECT MANAGER:
P.O. NUMBER:	DELIVERED TO:

Sample ID & Place Sampled	DATE	TIME	Container		Type	Matrix	Sample Source	Preservative	Analysis			Remarks
			Size	Qty								

	Name (PRINT)	Signature	Organization	Date	Time
Relinquished By:					
Accepted By:					
Relinquished By:					
Accepted By:					

KEY: TYPE: (G)rab, (C)omposite MATRIX: (W)ater, (S)oil, (A)ir, (S)ludge, (WP) Wipe (CM) Construction Materials SOURCE: (W)ater, (D)rilling, (W)ell, (S)urface soil, (O)ther, (SW)surface water PRESERVATIVE: (N)one

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APPENDIX 6

SOP - EQUIPMENT DECONTAMINATION

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE
EQUIPMENT DECONTAMINATION

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CAUTION

Disclaimer: This Standard Operating Procedure has been prepared for the sole use of ERTEC and may not be specifically applicable to activities of other organizations.

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1.0 Purpose and Applicability

The objective of this Standard Operating Procedure (SOP) is to describe the procedures used to decontaminate non-dedicated, non-disposable sampling equipment and instruments intended for reuse. This SOP does not apply to personnel decontamination procedures. Equipment decontamination is a process of neutralization, washing, and rinsing exposed outer surfaces of equipment to minimize the potential for contaminant migration or cross contamination. Equipment decontamination areas are set up within or adjacent to a specific area, as designated by the ERTEC Field Manager (FM).

This SOP describes the equipment, field procedures, materials and documentation procedures necessary to prevent contaminant migration and cross contamination. This SOP may be changed as required, dependent on site conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be agreed upon by the ERTEC Project Manager (PM) and the FM and will be documented in the field logbook.

Equipment involved in field sampling activities will be decontaminated before and after sampling. Equipment leaving the site will be also decontaminated prior to leave the site. This procedure describes the normal decontamination of equipment.

2.0 Material and Equipment

a. Plastic sheeting, buckets to collect wash water and rinsates.
b. Potable water.
c. Deoinized water.
d. 0.10N Nitric Acid
e. Non-phosphate detergent
f. Acetone
g. Methanol (pesticide grade or better)
h. Hexane (pesticide grade or better)
i. Aluminum foil
j. Pressure sprayer, rinse bottles, brushes
k. Plastic garbage bags,
l. Steam cleaner
m. Appropriate PPE

3.0 Procedure

3.1 Drilling Equipment

Drilling equipment will be steam cleaned before use. Well screens and riser pipe will also be steam cleaned to remove cutting oils and rested on clean polyethylene sheeting before installation. Pressurized steam will be used to remove visible excess from augers, and split-spoons. Steam cleaning will be conducted on a decontamination pad constructed in an area to be designed by the Client and site's operator.

3.2 Submersible Pumps

3.2.1 Submersible pumps used only for purging will be decontaminated as follows:

3.2.1.1. Calculate the volume of pumps plus any tubing which is not disposable and not dedicated to a single well. Pump three volumes of non-phosphate detergent solution to purge and clean the interior of the pump.

3.2.1.2 Rinse by pumping no less than 9 volumes of potable water. Decontaminate the exterior of the pump as described in Section 3.3.

3.2.2 Low-flow submersible pumps used to purge and sample wells will be decontaminated as follows:

3.2.1.1 Calculate the volume of pumps plus any tubing which is not disposable and not dedicated to a single well. Pump three volumes of non-phosphate detergent solution to purge and clean the interior of the pump.

3.2.1.2 Rinse by pumping no less than 9 volumes of potable water. Decontaminate the exterior of the pump as described in Section 3.3

3.2.1.3 Potable water rinse.

3.2.1.4 10% nitric acid rinse (ultra pure grade) when sampling for metals if equipment is stainless steel or Teflon. If equipment is carbon steel 1% nitric acid rinse will be made.

3.2.1.5 Deoinized water rinse.

3.2.1.6 Acetone rinse or methanol followed by hexane rinse (Solvents are pesticide grade or better) for equipment involved in the sampling of organics.

3.2.1.7 Air dry (Sufficient time will be allowed for the equipment to completely dry).

3.2.1.8 Wrap pump in aluminum foil, or store in a clean, dedicated PVC or PTFE storage container.

3.2.1.9 Before reusing the pump, rinse again with deionized water.

3.3 Decontamination of the non-dedicated sampling equipment including, split-spoons, scoops/trowels, bailers, Teflon coated cable and dredges will be conducted as listed below:

3.3.1 Non-phosphate detergent and potable water scrub.

3.3.2 Potable water rinse.

3.3.3 10% nitric acid rinse (ultra pure grade) when sampling for metals if stainless steel or Teflon equipment is used; 1% nitric acid rinse for carbon steel equipment.

3.3.4 Deionized or potable water rinse.

3.3.5 Acetone rinse or methanol followed by hexane rinse (Solvents are pesticide grade or better) for equipment involved in the sampling of organics.

3.3.6 Deionized water rinse.

3.3.7 Air dry (Sufficient time will be allowed for the equipment to completely dry).

3.3.8 Wrap with aluminum foil for transport and handling.

3.4 Decontamination of water-level indicator, interface probe and tape, steel tape, and data-logger.

3.4.1 Non-phosphate detergent and potable water wash.

3.4.2 Potable water rinse.

3.4.3 Non-phosphate detergent and potable water wash.

3.4.4 Air dry.

3.4.5 Store in a clean, dedicated PVC or PTFE storage container or dedicated equipment case.

4.0 Documentation

The following information should be included in the logbook as part of the equipment documentation:

a. Date and time of decontamination.
b. Equipment being decontaminated.
c. Name of person performing the decontamination.
d. Decontamination procedures.

5.0 Maintenance

None.

6.0 Precautions

Dispose of wash water, rinse water, rinsates and other sampling wastes (tubing, plastic sheeting, etc.) in properly marked and sealed containers, or as directed by the HASP.

Once a piece of equipment has been decontaminated, be careful to keep it in such condition until needed.

Do not eat, smoke or drink on site.

7.0 References

Health and Safety Plan.

APPENDIX 7

SOP – INVESTIGATION-DERIVED WASTE MANAGEMENT

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE
INVESTIGATION-DERIVED WASTE MANAGEMENT

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CAUTION

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1.0 Purpose and Applicability

The purpose if this Standard Operating Procedure (SOP) is to describe the procedures for handling, characterization and disposal of investigation-derived waste (IDW). The procedures contained in the following sections are applicable to field activities that pertain to hazardous materials and have a potential to pose personnel exposure. The IDW generated during field activities will require compliance with federal and state requirements for generation, storage, transportation and/or disposal.

Materials that may become IDW are:

- Personal Protective Equipment (PPE) - This includes disposable coveralls, gloves, booties, etc.
- Disposable equipment - This includes plastic (polyethylene) sheeting and equipment covers, aluminum foil, Teflon bailers, composite liquid waste samplers (COLIWASAs), Teflon tubing, broken or unused sample containers, sample container boxes, tape, ziploc bags, plastic garbage bags, etc.
- Soil cuttings from drilling or hand augering.
- Soil excavated from test pits.
- Groundwater obtained during well development or well purging.
- Cleaning fluids such as spent solvents and washwater.
- Packing and shipping materials.

2.0 Responsibilities

The field geologist/engineer (FG/FE) will be responsible for the proper labeling, handling and storage of the IDW generated during field activities. The FG/FE will also be responsible for the sampling equipment, and the collection, labeling, handling and storage of all samples until they are turned over to a carrier or directly to an analytical laboratory.

3.0 Handling of IDW

The IDW generated during field activities will be containerized as indicated below and in **Attachment A** of this SOP.

Soil cuttings, well development water, well purge water and decontamination fluids will be containerized separately from each sampling location in DOT-approved, 55-gallon drums. The drums will not contain a combination of soil and/or water from different wells or sampling locations. Each drum will be labeled showing the date of collection, area from which collection was made, and the nature of the contents as described in the following SOPs:

- SOP: Subsurface Soil Sample Acquisition
- SOP: Groundwater Sample Acquisition
- SOP: Conducting a Slug Test

Free-Phase product and contact water recovered from monitoring wells will be transferred to a closed head, DOT-approved, 30-gallon drum. The 30-gallon drum will be placed in an open DOT-approved, 55-gallon drum that will serve as secondary containment for temporary storage purposes. Each 30-gallon and 55-gallon drum will be labeled so the contents can be identified as described in the following SOPs:

- SOP: Free-Phase Product Recovery
- SOP: Conducting a Bail-down Test

Used product-selective absorbent "socks" (Soak Ease™) and disposable equipment will be containerized in DOT-approved, 55-gallon drums. The drums will be labeled.

Drums will be stored in a covered area of the site as specified in the Project Sampling and Analysis Plan. The drums will be inventoried on an IDW drum inventory log and sealed to prevent leakage of the contents or introduction of contamination from external sources. Drums will be placed on pallets to facilitate handling. A copy of the **IDW Drum Inventory Log** is presented as part of this SOP (see **Attachment B**).

Test Pit IDW will be containerized in a roll-off container. The container will be labeled with the date of collection, area or test pits from which collection was made and the nature of the waste (see **SOP #028 for Test Pit Excavation**).

4.0 IDW Sampling

4.1 Equipment

- Disposable COLIWASAs
- Hand Augers
- OVA-PID meter
- O_2 meter

4.2 Supporting Materials

- Sample containers
- Sample labels
- Decontamination materials
- Six-foot folding rule
- Stainless Steel Pan
- Stainless Steel Spatula
- Weighted measuring tape
- Field logbook
- Sample Log Sheets
- Chain-of-custody forms
- Nylon rope or other material for lowering sampling devices
- Rags for wiping the sampling device each time it is removed
- Indelible Ink Pen
- Aluminum foil
- Project Sampling and Analysis Plan
- Project Health and Safety Plan

4.3 Drum Sampling

4.3.1 Upon arrival to the site, immediately set up and organize the sampling equipment.

4.3.2 Conduct a site reconnaissance around the perimeter of the drum storage area. During the reconnaissance, take OVA-PID and O_2 readings and record the results in the Project Field Logbook. Visually examine and document with photographs the condition of the drums.

4.3.3 Complete the initial observation section of the IDW/drum inventory log.

4.3.4 Segregate drums based on the physical state of the material containerized (solids or liquids). Drums used to store free-phase product/contact water and absorbent "socks" will be excluded from the liquid drum sampling since these materials should be directly transported and disposed to an approved facility.

4.3.5 Liquid Investigation-Derived Waste Drum Sampling

4.3.5.1 Mark each drum on the top and side with a unique identifying number.

4.3.5.2 20% of the total number of drums will be randomly selected for sampling (see **Attachment C**).

4.3.5.3 Prepare a map showing the location of each numbered drum. Photographs should be taken for reference.

4.3.5.4 Wear appropriate personal protective equipment (PPE) as outlined in the Project Health and Safety Plan (HASP). In addition, personnel responsible for sampling should wear new sampling gloves before each sampling activity.

4.3.5.5 Open the drum. Measure the total depth to the bottom of the liquid phase waste material.

4.3.5.6 Samples will be collected using a disposable COLIWASA sampler.

4.3.5.6.1 Place the sampler in the open position. Slowly lower the sampler into the drum allowing for the collection of a sample that represents a core of the drum content.

4.3.5.6.2 Slowly withdraw the sampler making sure the closure system is properly set. The outside of the sampler should be wiped clean to avoid the contamination of other materials.

4.3.5.6.2 Slowly transfer the sample into the appropriate labeled sample jar avoiding spillage (refer to the **SOP #18 for Sample Labels**).

4.3.5.6.4 An appropriate number of one-liter amber glass containers (depending on the parameters to be analyzed) and three 40-ml volatile organic analyte (VOA) vials will be filled for each selected liquid drum. VOA vials should be filled first with zero headspace.

4.3.5.7 Securely tighten the jars

4.3.5.8 Wipe clean the outside of the jars.

4.3.5.9 Attach a label and seal the container, if necessary. The sample jar should be numbered using the drum number.

4.3.5.11 Immediately transfer the sample jar to a cooler with ice.

4.3.5.12 Record all observations in the Project Field Logbook. Fill out custody seals and chain-of-custody form (refers to **SOP #005 Field Logbook; SOP #001 Chain of Custody Record; SOP #018 Sample Labels**).

4.3.5.13 Decontaminate sampler as specified in the **SOP #004 Equipment Decontamination**.

4.3.5.14 Change gloves after each sample.

4.3.5.15 Initiate proper procedures for delivery of the sample to the designated laboratory. This includes packaging and sealing shipping containers with appropriate chain-of-custody documents (refer to the **SOP #019 for Sample Packaging and Shipping**).

4.3.6 Solid Investigation-Derived Waste Drum Sampling

4.3.6.1 Mark each drum on the top and side with a unique identifying number.

4.3.6.2 20% of the total number of drums will be randomly selected for sampling.

4.3.6.4 Prepare a map showing the location of each numbered drum. Photographs should be taken for reference.

4.3.6.5 Wear appropriate PPE as outlined in the Project HASP. In addition, personnel responsible for sampling should wear new sampling gloves before each sampling.

4.3.6.6 Open the drum. Collect soil samples using a hand-held auger.

4.3.6.6.1 Advance the auger to the middle of the drum, then slowly remove the auger and collect the soil sample directly from the auger flight at the point corresponding to the required depth.

4.3.6.6.2 Obtain a sufficient quantity of soil for the desired chemical analyses.

4.3.6.6.3 A grab sample will be separately collected from each selected drum for volatile organic compound (VOC) analysis. This sample will be collected first and placed in laboratory-supplied 4-oz jars.

4.3.6.6.4 Additional grab samples will be collected from each selected drum. Each sample will be composited as follows:

- Place each grab sample in a stainless steel pan.
- Thoroughly mix the sample using a stainless steel spoon. Scrape the soil from the sides, corners and bottom of the pan. Quarter the sample and move each quarter to the four corners of the pan.
- Mix each quarter of the sample individually, roll the four quarters to the center of the pan; and mix the entire sample again.

4.3.6.7 Securely tighten each jar.

4.3.6.8 Wipe clean the outside of the jars.

4.3.6.9 Attach the proper labels and seal the sampling jars, if necessary. Sample jars should be numbered using the drum numbers.

4.3.6.10 Immediately transfer the sample jars to a cooler with ice.

4.3.6.11 Record all observations in the Project Field Logbook. Fill out custody seals and chain-of-custody forms (refer to the **SOP #005 for Field Logbook; SOP-001 for Chain of Custody Record and SOP #018 for Sample Labels**).

4.3.6.12 Decontaminate sampling devices as specified in the **SOP #004 for Equipment Decontamination.**

4.3.6.13 Change gloves after each sample.

4.3.6.14 Initiate proper procedures for the delivery of the sample to the designated laboratory. This includes packaging, sealing, and shipping with the appropriate chain-of- custody documents (refer to the **SOP #019 for Sample Packing and Shipping**).

4.3.6.15 Following the completion of the drum sampling activity, all drums should be covered with plastic sheeting.

4.3.7 Roll-Off Container Sampling (Solid-Investigation Derived Waste)

4.3.7.1 Upon arrival to the site, immediately set up and organize the sampling equipment.

4.3.7.2 Conduct a site reconnaissance around the perimeter of the container location. During the reconnaissance, take OVA-PID and O_2 meter readings and record the results in the Project Field Logbook. Visually examine and photograph the container condition.

4.3.7.3 Obtain soil cores from three equidistant locations. Soil cores will be collected using a hand-held auger.

4.3.7.4 Advance the auger to the required depth, then slowly remove the auger and collect the soil sample directly from the auger flight at the depth required by the Project Sampling and Analysis Plan.

4.3.7.5 Three grab samples will be collected from each of the three equidistant core samples. These samples will be analyzed for VOCs. The three grab samples will be collected from three different depths within the container (typically from 1.5, 2.5 and 3.5 feet from the surface). A total of nine grab soil samples will be collected from the container.

4.3.7.6 Additional grab samples will be collected from the three cores at the three depths mentioned above (total of nine grab samples). These samples will be composited and analyzed for the remaining parameters specified in the Project Sampling and Analysis Plan. The mixing procedure for a composite sample is described in **Step: 4.3.6.6.4**.

4.3.7.7 Securely tighten the sample jars.

4.3.7.8 Wipe clean the outside of the jars.

4.3.7.9 Attach proper labels and seal the containers, if necessary. Sample jars should be numbered using the roll-off number, if there are more than one roll-off.

4.3.7.10 Immediately transfer the sample jars to a cooler with ice.

4.3.7.11 Record all observations in the Project Field Logbook. Fill out appropriate chain-of-custody form (refer to the **SOP# 005 Field Logbook; SOP # 001 Chain of Custody Record and SOP # 018 Sample Labels**).

4.3.7.12 Decontaminate sampling the device as specified in the **SOP #004 for Equipment Decontamination.**

4.3.7.13 Change gloves after each sample.

4.3.7.14 Initiate proper procedures for delivery of the samples to the designated laboratory. This includes packaging, sealing, and shipping with appropriate chain of custody documents (refer to the **SOP #019 for Sample Packing and Shipping**).

4.3.8 Other IDW

Decontaminated disposable equipment, PPE and other waste trash that are collected and stored in drums during field activities will be treated as non-hazardous and disposed of in accordance with applicable regulations.

5.0 Documentation

5.1 A Project Field Logbook will be maintained as an overall log of all samples collected throughout the sampling activity.

5.2 The first five pages will be left blank for an index, notes, etc.

5.3 The following information will be recorded in the logbook:

1. Project name
2. Project number
3. Weather conditions
4. Purpose of sampling
5. Unique, sequential field sample number
6. Details of the sampling container
7. Identification of sampling crew members
8. Number and volume of samples taken
9. Sampling methodology
10. Sample preservation
11. Date and time of sampling
12. Sample shipment (e.g., name of laboratory and carrier agent)
13. References (e.g., maps of the sampling site)
14. Field Observations
15. Signature and date of the personnel responsible for observations.
16. Decontamination procedures
17. Deviations from the Project Sampling and Analysis Plan
18. Visitor's names

5.4 Sign and date each page.

5.5 The last five (5) pages will be sued for recording calibration data from the OVA-PID and O_2 meters. Use the page number or a separately recorded "Cal Reference Number" to refer to each calibration.

5.6 The logbook will be kept in possession of the FG/FE.

5.7 The following additional forms are required to ensure that adequate documentation is made of the sample collection activities.

a. sample logs
b. Chain of custody forms
c. Shipping forms
d. IDW/Drum Inventory Log

6.0 References

Environmental Protection Agency, 1991. **Management of Investigation-Derived Waste during Site Inspections**. OERR Directive 9345.3-02.

Environmental Protection Agency, 1991. **Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies**. OSWER Directive No. 9835.1 (d).

Environmental Protection Agency, 1986. **Test Methods for Evaluating Solid Waste SW-846**. Third Edition September 1986.

Environmental Protection Agency, 1987. **A Compendium of Superfund Field Operation Methods**. EPA/540/P-87/001.

SOP #001 Chain of Custody Record.

SOP #004 Equipment Decontamination.

SOP #005 Field Logbook.

SOP #018 for Sample Labels.

SOP #019 Sample Packaging and Shipping.

ATTACHMENT A

HANDLING OF IDW

ATTACHMENT A

Type of IDW	Method of Storage
Disposable Personal Protective Equipment	Double bag waste. Place in 55-gallon drum with tight-fitting lid. Identify and arrange with FG/FE for disposal.
Reusable Personal Protective Equipment	Decontaminate as per SOP for Equipment Decontamination.
Spent Solvents (Methanol, 0.10 N Nitric Acid, Acetone, Hexane)	Containerize in original containers. Clearly identify contents. Return to ERTEC's office for proper disposal.
Soil Cuttings	Containerize in 55-gallon drum with tight-fitting lid. Identify and leave temporarily on-site. Arrange with FG/FE for testing and disposal
Well Development Water and Well Purge Water	Containerize in 55-gallon drum with tight-fitting lid. Identify and leave temporarily on-site, arrange with FG/FE for sampling and disposal.
Decontamination Fluids	Containerize in 55-gallon drum with tight-fitting lid. Identify and leave temporarily on-site, arrange with FG/FE for sampling and disposal.
Soil Excavated from Test Pits	Containerize in a roll-off container. Identify and leave temporarily on-site, arrange with FG/FE for sampling and disposal.
Free-Phase Product and Contact Water	Containerize in a closed head 30-gallon drum. Place the 30-gallon drum in an open 55-gallon drum. Identify and leave temporarily on-site, arrange with FG/FE for disposal. Sampling of this material is not required because it will be transported and disposed to an approved facility under RCRA Subtitle C generator permit.
Absorbent "Socks" (SockEase™)	Double bag and containerize in a 55-gallon drum with tight-fitting lid. Identify and leave temporarily on-site, arrange with FG/FE for disposal. Sampling of this material is not required because it will be transported and disposed to an approved facility under RCRA Subtitle C generator permit.
Disposable Equipment	Containerize in 55-gallon drum with tight-fitting lid. Identify and leave temporarily on-site, arrange with FG/FE for disposal in a municipal landfill.
Trash (decon pad, plastic sheeting, packing and shipping material and other consumable supplies)	Double bag waste. Place in 55-gallon drums for disposal according to the applicable regulations.

ATTACHMENT B

IDW DRUM INVENTORY LOG

ATTACHMENT B

IDW DRUM INVENTORY LOG

Site Name: _____ **Site Number:** _____

Site Location: _____ **Page** _____ **of** _____

Initial Observations:

Drum Number:					
Drum Type/Size [A]					
Drum Condition					
Identification (labels, etc.)					
%Full					

Description of Drum Content:

Physical State [B]					
Color					
Other					

Disposal:

Hauler					
Disposal Site					
Disposal Date					

Comments: _____

_____

_____

Notes:

(A): Example: 30-gal FOH or 55-gal-liquid

(B): Solid
Liquid
Sludge
Mixture of the Above

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ATTACHMENT C

WASTE SAMPLE LOG

ATTACHMENT C

Waste Sample Log

Project Name: _____ **Project Number:** _____
Date: _____ **Circle Type: drum, tank, roll-off container**
Site Location: _____

_____

Sample Collection

Equipment Used: _____
Number of Samples Collected: _____

Sample Number	Depth (ft)	Type of Material	Size of Container	Chemical Analysis Request

Comments: _____

_____

_____

_____

Laboratory Designation: _____

Collector's Name: _____
Nota:

(A): **Solid**
Liquid
Sludge
Mixture of the above

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APPENDIX 8

SOP – SAMPLE DOCUMENTATION AND SHIPPING

SAMPLING AND ANALYSIS PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER ESSO SERVICE STATION 363
224 CALLE VILLA
PONCE, PUERTO RICO

DISUR PROJECT PET 021
ERTEC PROJECT E145332

STANDARD OPERATING PROCEDURE
SAMPLE PACKING AND SHIPPING

Prepared for ERTEC, P.S.C. – Environmental Consultants
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Effective Date: August 25, 2010

CAUTION

Disclaimer: This Standard Operating Procedure has been prepared for the sole use of ERTEC, P.S.C. – Environmental Consultants and may not be specifically applicable to activities of other organizations.

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TABLE OF CONTENT

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1.0 Applicability

The objective of this Standard Operating Procedure (SOP) is to describe the procedures for preparing soil, water, separate phase hydrocarbon (SPH) and QA/QC samples to be shipped to an analytical laboratory. This procedure is intended to protect the integrity of the samples until they are turned over to the analytical laboratory or to a carrier that will transport them to the analytical laboratory. This SOP describes the necessary equipment, field procedures, materials, sample handling, and documentation procedures necessary to handle and ship samples for chemical analysis.

Appropriate sample containers, preservation methods, quality assurance/quality control requirements, and laboratory holding times for samples to be collected at a site are summarized in the Quality Assurance Project Plan (QAPP) that is part of a Project Sampling and Analysis Plan. Be sure to review these documents for your site very carefully.

Analytical laboratories will usually supply cleaned and quality controlled sample containers. The procedures provided in USEPA's Office of Solid Waste and Emergency Response (OSWER) Directive No. 9240.0-05, "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers" (7/91) should be followed y the laboratory. The analytical laboratories will also supply analyte-free water, sample labels, and preservatives. Field personnel are responsible for properly labeling containers and preserving samples (as appropriate).

This is a standard (i.e. typically applicable) operating procedure that may be varied or changed as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be agreed upon with the Project Manager and documented in the Project Field Logbook.

2.0 List of Necessary Equipment

Equipment to be used during sample collection includes the following:

- The Project Sampling and Analysis Plan;
- Appropriate health and safety equipment as specified in the Project Health and Safety Plan;
- Appropriate decontamination equipment;
- Non-talc gloves;
- Indelible marking pens;
- Clear shipping tape;
- Sealable Ziploc bags;

- Bubble wrap;
- Styrofoam plastic bags;
- Field notebook;
- Ice;
- Inert absorbent packing material;
- Sample containers;
- Sample labels;
- Chain-of-custody forms;
- Waterproof hard plastic Insulated coolers; and
- Custody seals.

3.0 Sample Container Handling

1. Place the appropriate sample label, written in indelible ink, on each sample container.

2. Decontaminate the sample container by wiping with a cloth.

3. Cover the label with clear packing tape to secure the label onto the container.

4. Check the caps on the sample containers to ensure that they are tightly sealed.

5. If refrigeration is necessary, place samples on ice in a cooler immediately after collection

6. Initiate chain-of-custody provided by the laboratory. Record each sample, including QA/QC samples on the chain-of-custody form. **Note:** If the designated sampling person relinquishes the samples to other sampling or field personnel for packing or other purposes, the samplers will complete the chain-of-custody prior to this transfer. The appropriate personnel will sign and date the chain-of-custody form to document the sample custody transfer.

4.0 Packing of Sample Containers for Shipping

1. Using tape, secure the outside and inside of the drain plug at the bottom of the cooler.

2. Place each sample container in an individual clear Ziploc bag and seal.

3. Place a garbage bag in the cooler as a liner to prevent melted ice from leaking out.

4. Place inert packing material such as bubble wrap at the bottom of the cooler to prevent cracking of sample containers.

5. Place the sealed sample containers and package upright in the cooler.

6. Double bag loose ice in sealable plastic bags and place loosely in the cooler around the sample containers.. Do not pack ice so tightly that it may prevent addition of sufficient cushioning material.

7. Fill the remaining space in the cooler with packing material.

8. Place the original signed copy of the completed chain-of-custody form in a large sealable plastic (Ziploc) bag and tape the form to the inside of the cooler lid. Chain-of-custody forms will be completed in accordance with **Section 5.0** of this SOP.

9. Close the lid of the cooler and fasten with tape.

10. Wrap strapping tape around both ends of the cooler at least twice.

11. Mark the cooler on the outside with the following information: shipping address, return address, "Fragile" labels on the top and on one side, and arrows indicating "This Side Up" on two adjacent sides.

12. Place signed and initialed custody seal tape over front and back of the cooler lid and cover with clear plastic tape.

5.0 Shipping of Sample Containers

1. All samples will be transported as low-concentration environmental samples delivered by an overnight carrier, or other appropriate means, to the laboratory as soon as possible, ideally within 24 hours of the time of sample collection.

2. The following chain-of-custody procedures will apply to sample shipping:

a. All pertinent information will be entered on the chain-of-custody form in the field. Assignment of the matrix/matrix spike duplicate (MS/MSD) assignments, and the analyses requested for each sample will be made.

b. Relinquish the sample containers to the laboratory via overnight carrier. The signed and dated forms must be included in the cooler. The express carrier will not be required to sign the chain-of-custody forms. The sampler should retain the express carrier receipt or bill of lading; this document serves as an extension of the chain-of-custody during shipment.

c. When the samples are received by the laboratory, the laboratory personnel shall complete the chain-of-custody forms by recording receipt of samples, measuring and recording the internal temperature of the shipping container, and comparing the sample identification numbers on the containers to the chain-of-custody form.

d. A copy of the chain-of-custody form shall be returned from the laboratory to the Project QA/QC Officer. The original shall be retained by the laboratory.